LOCATIVE RELATIONS IN AMERICAN SIGN LANGUAGE
WORD FORMATION, SYNTAX AND DISCOURSE

by

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This thesis investigates the role of motion and location in the grammar of American Sign Language and the degree to which motion/location relations lie at the heart of all grammatical systems, particularly those components concerned with thematic relations.

Chapter 1 presents an overview of spatial notions and the role they play in various analyses of spoken language. The claim that languages may exhibit certain sublexical regularities with respect to lexico-semantic primitives such as motion and location forms is distinguished from a theory of lexical decomposition.

Chapter 2 introduces the notational system used in the thesis by examining in detail a series of complex signs which are near minimal pairs with respect to their structural properties and the formatives which comprise them.

Chapter 3 presents a systematic introduction to the ASL lexicon first in schematic terms and later by an examination of the ASL verb system.

Chapter 4 argues for a level ordered, category neutral X-bar account of ASL word formation. Two levels are proposed which differ only on the basis of the position at which their heads occur. Stipulation of head position is shown to eliminate any rule specific statement concerning the ordering of combined elements.

Chapter 5 discusses several issues concerning the role of thematic relations internal to lexical items as well as cases in which thematic positions internal to words appear to be linked with syntactic arguments theta-marked for the same role. A model of word internal theta-role assignment is proposed.

Chapter 6 examines the locative basis of co-reference relations in ASL and the overt co-indexing relationships between discourse NPs, syntactic arguments, case marking clitics and a set of locative agreement markers on the verb. Case relations and theta-roles are shown to be marked by two distinct types of markers which exhibit interestingly different properties with respect to co-indexing relations.

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Although as a dissertation this project began a year and a half ago, it is really the culmination of research that began in 1972 and has continued to the present. For seven of those years this project continued, but took a back seat to my first dissertation topic on vowel length, syllable structure and tone in Slovenian, a project I now fondly refer to as my "stunt dissertation." For the past year this research has been on the backburner while my ASL research has taken its rightful place as the focus of my interests. Still, I owe a great deal to the people who helped me with that work and, although it may not be readily apparent, my experiences with them have had a profound influence on my current research. Therefore, before I begin the traditional round of thanks I would like to give special thanks to the people involved with that project.

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Love,

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### Locative Relations in ASL Word Formation, Syntax and Discourse

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CHAPTER 1
SPATIAL NOTIONS AND THEIR ROLE IN LANGUAGE

Motion in space and location in space are core notions that have surfaced time and again in the work of linguists attempting to characterize the semantics of natural language. Yet, although a basic insight is shared by these researchers, the diversity of analyses and the divergent uses of spatial expressions taken to constitute semantic primitives is astounding. Every analysis exhibits its own idiosyncratic interpretation of the organization of meaning. Each has its own set of assumptions, yet they all share the common conviction that the core semantic units in language are universal and cognitively based.

Unfortunately, although we share certain intuitions about the meaning of very concrete notions (like the meanings of spatial terms such as "to," "in," "on," "at," etc.), our intuitions fail us when we attempt to pin down the meaning of more abstract notions (like the meanings of the following words: "give," "buy," "sell," "encourage," "understand," "seem," "kill," "smash," "smear," "eat,"
"sleep," "want," "cause," or even "game," "chair," "bachelor," or "happy"). It has been proposed that the meaning of these words can be stated in terms of more primitive semantic notions combined in some fashion to form a complex semantic proposition. These complex propositions are then extended in some systematic fashion (metaphorical extension) to more abstract domains (semantic fields: possession, identification, cognition, perception, emotion, etc.). This break down of words into complex propositions composed of semantic primitives is what has been called lexical decomposition.

1.1 SUBLEXICAL COMPLEXITY

This thesis will not in any way advocate a theory involving lexical decomposition. Please keep this disclaimer in mind. In the course of this chapter, we will explore the line of argumentation used by proponents of lexical decomposition. Many of our examples will be the classic examples addressed by their analyses. In addition, the overt morphology of ASL signs will often exhibit striking parallels to the semantic representations proposed for their near counterparts in English. Despite superficial evidence which might be taken as tangible linguistic evidence in support of lexical decomposition, we will argue instead that the individual morphemes which are part of the sublexical structure of a sign are not to be considered the basic building blocks of word meaning.
Such a position is by no means novel. Aronoff (1976) made this point most cogently in his thesis, and it has been reiterated time and again by subsequent researchers. So why return to this issue? There are several reasons.

Not many languages previously examined exhibit the degree of sublexical morphological complexity so readily observable in ASL. The sublexical structure of ASL exhibits a syntax all its own. Thus, without careful inspection, ASL might lead one to return to the early position held by generative semanticists (Postal (1970), McCawley (1968), Newmeyer (1970), Lakoff (1971, 1972), Morgan (1969), etc.) which claims that there is no aspect of meaning which cannot be represented in phrase marker form and that semantic representation is the natural input into syntactic rules. Generative semanticists recognized no break between the semantic representation of words and surface structure. In other words, they rejected any notion of Deep Structure or any natural location for the insertion of lexical items. For a thorough review of generative semantics and convincing arguments against it see Newmeyer (1980). We will show in our analysis of ASL that even though ASL signs exhibit an elaborate sublexical structure which appears to offer morphological evidence for lexical decomposition, the internal structure of the word is independent of the role it will play in the syntax. Furthermore, the meanings associated with sublexical units in ASL do not systematically give us word meaning in the way that sub-phrasal elements (words) yield a systematic phrase meaning.
Every language has a certain amount of sublexical morphological regularity. Consider, for example, the set of latinate prefixes in English: *con*, *pre*, *re*, *per*, *in*, etc.. At first glance, it seems easy to assign these prefixes some meaning which combined with other latinate stems yields words whose meanings are predictable from the sum of their parts. For example, *predict* might be said to be composed of *pre*, a morpheme meaning "before," and *dict* a morpheme meaning "to say." Thus, one might assume that *predict* means "to say before." But, of course, this is not the "meaning" of *predict* in any real sense. Not even in Latin, where these elements might be called productive morphemes, does the sum of the meanings of the parts equal the meaning of the whole.

On the other hand, to say that the meaning of *predict* is arbitrarily related to the morphemes which comprise it seems equally extreme. Once we understand the concept which gets the label *predict*, it somehow makes sense that its label is comprised of morphemes which are associated with the meanings "say" and "before." The relation between these morphemes and the word they comprise is more mnemonic in function than compositional. The fact that these morphemes can be tied to some inherent meaning of their own, and the fact that they often have an indirect connection with some aspect of the meaning of the word which they comprise, tempts us to think of them as morphemes in the traditional sense—the basic meaning unit. They are not.
Lexical compounds provide us with a clear case where the meaning of the parts cannot predict the meaning of the whole. Generally we see a compound as a word comprised of two or more parts which are recognizable as words themselves but which have subsequently lost their word status: they no longer function as the domain for stress assignment, they undergo phonological rules which are generally blocked by word boundaries, their meaning may no longer contribute to the meaning of the word as a whole.

Take the classic example of the compound blackboard. Clearly, we can see that this word is comprised of two parts: black and board. Furthermore, these two parts show up as independent words elsewhere in the lexicon. If words are the basic unit of meaning then these two words combined, in an adjective phrase let's say, will each contribute their meaning to the meaning of the phrase as a whole. This is what happens. In the phrase black board the two words are compositional. The phrase black board can refer to any kind of board and cannot refer to something which is neither black nor a board.

The compound blackboard is quite a different story. This word has clearly undergone semantic drift. First, the meaning of /board/ appears to have become more specific. The compound refers only to boards of a specific type—flat objects which are designed for the purpose of being written on with chalk. Furthermore, the meaning associated with the member black is no longer essential to the meaning of the word. Blackboards may be any color provided they are designed to be written on with chalk. Then again, we know that the meaning of black is indirectly relevant to the word in the
sense that the item we refer to as a blackboard was originally only black. In this sense, the compound member, /black/, functions as a reasonable mnemonic for conjuring up the notion associated with blackboard. We don't necessarily want to assume that because there are green blackboards, the morpheme /black/ has lost its association with the color we call black. The key is to recognize the word, rather than any sublexical unit, as the basic unit of meaning. Words within words, morphemes within words, or even sublexical sound clusters associated with sound symbolism (gl. fl. str. gl. etc.) [1], may themselves be associated with certain meanings. The important thing is that these meanings can be totally irrelevant to the meaning of the word as a whole.

We can think of the word as an opaque domain with respect to meaning. Even though its parts may, but need not, exhibit a compositional property with respect to some interpretation, that interpretation may be only indirectly related or totally unrelated to the meaning of the word itself.

Aronoff (1976:10-15) demonstrated that latinate prefixes in English cannot be tied consistently to a single meaning. He showed that when one looks beyond the standard examples cited to illustrate the sublexical regularities to be found in the latinate portion of the English lexicon, one finds a mass of inconsistencies and is unable to tie a given latinate prefix or stem to any single meaning.

1. Recent research on sublexical sound clusters associated with sound symbolism can be found in Rhodes and Lawler (1981), McCune (1983), Brown (1958).
Demonstrating an inability to associate a morpheme with a specific meaning isn't really crucial to our argument. Even if each morpheme can be assigned a given meaning, the word is still to be seen as the most basic unit of meaning. The meanings associated with the morphemes internal to a word are not relevant to the meaning of the word as a whole.

Consider idioms. Idioms are a series of what appear to be individual words which actually function as a single non-decomposable lexical item. For instance, let the cat out of the bag is an idiom which means something like "to reveal information which was intended to be kept secret." The meaning of this word/idiom does not follow from the meanings of the individual words which appear to comprise it. Yet, each of these words does have a meaning associated with it. Furthermore, the literal meaning of the "idiomatic phrase," is indirectly relevant to the meaning of the idiom. The idiom forces us to make a metaphorical tie between "letting out the cat" and "letting out the information." It is metaphorically mnemonic for the notion of "revealing information" in the same way that /pre/ and /dict/ (i.e., "before" and "say") mnemonically bring to mind the concept associated with the word predict.

Sublexical morphemes are much like the components of an idiom. The fact that they can be assigned a meaning does not imply that they are basic units of meaning relevant to the meaning of the word. In other words, we may know all there is to know about the meaning of the words kick, the and bucket, but if they comprise the single word kick the bucket, such knowledge will in no way allow us
to make the connection between these sublexical units and the meaning "to die."

In fact, constructions which force us to recognize the elements, not as sublexical members of an idiom, but as individual words (basic units associated with meanings which are relevant to the interpretation of a phrase) can only be interpreted literally. A sentence like It was the bucket that Mary kicked cannot mean "Mary died." In this case the meanings of the individual members of the phrase are relevant to the meaning of the phrase as a whole.

Lexical items in ASL have a complex morphological structure. Internal to the sign/word we will see morphemes which can be tied to meanings and we will see that, like in the case of English idioms, these lexical items have their own internal syntax. Also like idioms, the sublexical structure of the sign can be assigned a semantic interpretation. This interpretation is irrelevant or only indirectly related to the meaning of the word as a whole. We will show that contexts which force the elements internal to the sign to be interpreted as independent words break the idiom and force a literal reading. (See the discussion of the sign for "vote" in Chapter 5.)

The difference between ASL and English lies in the overwhelming preponderance of "idioms" and multimorphemic signs in ASL. Every word is overtly "decomposable" into sublexical units which can be associated with a meaning. There is often a metaphorical relation between the literal interpretation of the sign and its actual meaning. Thus, there is a strong temptation to
consider the sublexical structure as being relevant to the meaning associated with the sign—namely, to assume that the meanings of the parts comprise the meaning of the whole. Also, the sublexical units comprising a sign are motion/location morphemes and classifiers. The fact that motion and location morphemes are the basic sublexical units means that signs not only show the syntactic regularity of idioms, or compounds for that matter, but they also exhibit a transparent and highly regular thematic structure (i.e., explicit information concerning thematic roles like source, goal, theme, etc.).

It is easy to fall into the trap of assuming that the sublexical morphology of the sign is an overt reflection of its lexical decomposition. We will strive to reject this assumption while maintaining that the sublexical structure of the sign is still an important domain of study which can reveal valuable insights into the possible set of "lexico-semantic" primitives upon which all languages seem to draw. Furthermore, we will argue that these "lexico-semantic" primitives tie directly into the perceptual and cognitive systems humans are innately endowed with. Thus, they are relevant to language in many respects. They are inherently tied to thematic relations and as such may facilitate the bootstrapping process from perceptual and cognitive knowledge to linguistic knowledge.

Before addressing such lofty issues, which are best left to the conclusion chapter where speculation is to be expected, let's return to a mini-explication of the approach we hope to reject. Our reason for doing this is not to set up an adversary which we
will then attack. Rather, we explicate this viewpoint because its literature is rich with valuable observation and insights relevant to our research. It is interesting to note that in arriving at abstract lexical decompositions for words without any overt internal morphology, motion and location still came to play a central role.

The argument has been made, albeit casually, that first order predicate calculus is to be favored for the logical representation of language on the grounds that time and again when humans have devised logical systems they have reflected this sort of structure. A similar case is to be made for the locative hypothesis. However we label the enterprise—whether we associate it with semantics or not, with the lexicon or the syntax—humans speculating about the primitive bases of language have returned time and again to locative/directional primitives. This is to be seen not only in the work of researchers dealing directly with the lexicon (Hjelmslev (1935) Wierzbicka (1972, 1980), Mel'chuk (1970, 1973)) and semantic representation (Fillmore (1968, 1971, 1979, 1977), Gruber (1967) Gruber (1967, 1976 [1965], 1984), Jackendoff (1972, 1976, 1978, 1983), Talmy (1972, 1976, 1978, 1983, (in press)), Miller and Johnson-Laird (1976); but even arises as necessary to the theories least tolerant to any decompositional approach Chomsky ((1981); theta theory), Bresnan ((1982); mapping between thematic relations and grammatical relations). Locative notions have also proved central to numerous accounts of child language acquisition (Bowerman (1979), Gentner (1978), E. Clark (1973, 1979), H. Clark (1973), Bernstein (1980), Goodhart (1984), etc.). Although motion
and location (sources, goals and themes) pop up as part of every linguistic theory, no theory has investigated these relations in as great detail as those advocating lexical decomposition.

1.1.1 Lexical Decomposition

Lexical decomposition has its drawbacks. If one buys such an approach, then the task still remains to determine what the semantic primitives might be, how much information is to be included in the lexical representation of a word, what aspects of the semantic representation of the word are relevant to the morphology and syntax of a language, and exactly what role semantics plays in the formal linguistic characterization of language. Furthermore, one might ask what constitutes an argument for one over another proposed semantic decomposition for any given lexical item.

Setting the ground rules for such research endeavors is no easy task. Very little has been proposed in the way of constraints on exactly how much information a semantic decomposition should include. Arguments for lexical decomposition are generally very subtle. They employ indirect means for breaking down the meaning of a word. Often tests consider the ability of a given word to co-occur with some semantic primitive. The argument goes as follows: If a word has incorporated into its semantic decomposition the meaning of some semantic primitive then co-occurrence in the surface string with some additional morpheme which serves to signal the same semantic relation or meaning should be blocked. Let us digress for a moment to consider a series of
examples and discussion which are characteristic of the kinds of issues raised when doing research on semantic decomposition.

One common test concerns the ability of a given verb to co-occur with particular prepositional phrases. Restrictions on co-occurrence are taken to indicate that the meaning of the locative expression is already included in the verb in question. For example, we can say "Jane approached the door" but not "Jane approached to the door." Presumably, this is because approached directly incorporates the locative relation TO. [2]

If we look at this example in a Government and Binding framework we might want to state the facts in different terms. We might say that the verb approach is a case assigner. It assigns objective case to the noun door, which it governs. Furthermore, it assigns a theta role to this argument as well, namely the role goal. If we stretch our imaginations it might be possible to see the lexical stipulation that approach assigns the role goal to its argument as Government and Binding’s answer to TO-incorporation (ala Gruber (1976 [1965]) or Fillmore (1968)).

Given that we entertain this rough equivalence between two rather divergent theories, a possible second test arises. Verbs and prepositions are case assigners; nouns and adjectives are not.

2. We need to make note of a potentially confusing situation which involves notations using upper case letters. We will use words in upper case, in the traditional way, to indicate meanings. However, a rather widely accepted method for notating ASL signs, which we will hearafter refer to as "glossing," also uses upper case letters. To distinguish these two uses, we will underline those examples which refer to meanings.
Thus, we find that verbs can assign case to a following NP argument, but nouns and adjectives require the presence of an intervening preposition (a case assigner) to assign case to the NP argument. The following examples illustrate this fact. The verb, appreciate, assigns case to Mary. The noun, appreciation, and the adjective appreciative, cannot. Thus, the preposition of appears in these forms so that the following NP can receive case. Let's for simplicity's sake consider of to be a generic or dummy preposition which arises for purposes of case assignment.

1. John appreciates Mary.

2. John's appreciation of Mary is well known.

3. John is appreciative of Mary.

Now, consider the approach example again. In instances where a preposition is necessary for the assignment of case and where the verb assigns a specific theta role to its argument (i.e., appears to have an incorporated locative relation: TO, FROM, etc.), it is the preposition commonly associated with this "incorporated" locative meaning which surfaces to assign the case: "Her approach to the door was interrupted by the phone call."

Of course, approach was chosen to illustrate these tests because it is a fairly straightforward example. There are plenty of examples which are far less clear cut. Consider the verb depart which need not, but optionally does, occur with the preposition from. The two sentences below are equivalent in meaning.
4. They departed the airport on time.

5. They departed from the airport on time.

The test involving restrictions on co-occurrence with a related preposition (e.g., from) buys us little in this case. The second test holds, however. The presence of from becomes obligatory in nominals as would be expected.

6a. *Their departure the airport was uneventful.

6b. Their departure from the airport was uneventful.

Even though restriction on the co-occurrence of a locative preposition and verb cannot be used to argue for the presence of an incorporated FROM, the appearance of from as opposed to the generic case assigner of does indicate some inherent thematic tie between the word depart and the locative relation FROM.

The verb enter adds yet another twist to the story. This word seems to incorporate the locative relation INTO in its lexical decomposition. As in the case of approach, enter cannot [3] co-occur with its related preposition, into; and furthermore, this preposition surfaces in the nominal. The first two examples below indicate that a co-occurrence restriction on into and enter exists. The second two examples show that into surfaces when a NP argument follows the noun form of enter, namely entry.

3. Judgments vary on the ability of into to co-occur with enter.
7a. *They entered into the room.

7b. They entered the room.

8a. Their entry into the room was prohibited.

8b. *Their entry the room was prohibited.

On the other hand, unlike the approach example where the verb never co-occurs with the preposition associated with its incorporated locative relation, the verb enter allows this preposition in utterances where the verb is used in a metaphorically extended context; i.e., not given a literal locative interpretation. For example, when a physical location or object is "entered," like an argument or a conversation, this preposition can appear. The examples below illustrate this fact.

9a. They entered the room.

9b. *They entered into the room.

10a. *They entered \{ an argument. \}
     \{ a conversation. \}

10b. They entered into \{ an argument. \}
     \{ a conversation. \}

Interestingly, the more definite (where perhaps more definite is more tangible?) the abstract entity becomes, the more likely it is
for the preposition to be optional.

11a. They entered \{the argument. the conversation.\}

11b. They entered into \{the argument. the conversation.\}

What we have seen in the preceding sets of examples are glimpses of regularity in a system which is highly variable. Enter, approach, and depart cannot be lumped into one unified class; yet we can see that, to varying degrees, they share properties concerning what appear to be semantically incorporated locative notions. The regularity we see may only be tangentially relevant to the organization of the English lexicon. It may very well be, as close inspection of the OED entries for the above forms indicates (OED, pp. 413,204,208), that the regularities that can be noted are merely historical vestiges of regularity in the lexicons of other languages from which these words were borrowed (particularly in the case of latinate forms like depart (de "from" + partire "to divide") or approach (ad "to" + propi-are "to draw near").

The line of argumentation utilized by proponents of lexical decomposition is impressive in its intricacy and complexity, but constitutes an indirect form of argumentation. If we accept the premise that there are semantic primitives and that lexical
decomposition is possible, then any attempt at an analysis of English forces us to such cumbersome ends. This is because English, word internally, has little morphology to speak of, i.e., little overt information internal to the word which might lead us to such a conclusion.

1.1.2 Lexico-Semantic Primitives

Before returning to the lack of sublexical complexity in English, let's reconsider the role of the morpheme in linguistic theory. The morpheme has traditionally been seen as the smallest functioning unit in the composition of words. It has also, with some controversy, been termed the smallest unit to be associated with a meaning. The above characterization of a morpheme is valid even if the meaning associated with this sublexical unit is irrelevant to the meaning of the word as a whole—even if the relation of word and morpheme parallels the relation between an idiom and one of its word-like members.

The morpheme is certainly not the smallest unit of meaning, but rather the smallest meaning unit a particular language assigns a label to. One language may use a single morpheme to label a given concept, whereas another might use a composite of morphemes to label the exact same concept. In either case, the result is a single word.

Up to now we have played rather fast and loose with the term "morpheme." Aronoff (1976) struggles in his thesis with the task of defining the morpheme. He strives to maintain the concept of the
morpheme while rejecting the hypothesis that morphemes are the minimal meaningful elements of language. He points out that "the original definition of morpheme has three aspects: constant form, arbitrary link, constant meaning." Taking into account latinate morphemes like the mit which occurs in remit, permit, commit, transmit, submit, admit and permit and which have, at least in English, no constant meaning, Aronoff expands the third aspect of constant meaning to include (as an alternative) a phonological process as well. Even though mit cannot be tied to a constant meaning, this latinate prefix does distinguish itself from similar strings like the mit in vomit (for which there is no evidence that we have a prefix vo and a stem mit) by serving as the only environment for a t to s softening rule: remit/remissory, but not vomit/vomissory. This change is confined to only the latinate mit stem. Thus, Aronoff (1976:13) concludes: "Mit is therefore a morpheme, though it has no meaning." He eventually proposes the most acceptable characterization of a morpheme, at least for our purposes, in the following discussion (Aronoff (1976:15):

But, I only wish to point, perhaps a little dramatically, to what is essential about a morpheme: not that it mean, but rather merely that we be able to recognize it. A morpheme is a phonetic string which can be connected to a linguistic entity outside that string. [4]

4. To be fair in quoting, the conclusion of this paragraph is the following: "What is important is not the meaning, but its arbitrariness. This is close to Harris (1951)." We will address the issue of arbitrariness a bit later.
Let us follow Aronoff in recognizing that morpheme is not necessarily synonymous with meaning and stick with the notion that it is "a phonetic string which can be connected to an entity outside that string," however, vague such a notion might seem. But, let's think a bit more about latinate stems like mit. Surely, in English they are no longer tied to a constant meaning, but at some stage of Latin there must have been some meaning sense, however loose, which could be consistently associated with mit. Then, meanings changed, languages diverged, and we came to the rather shaky position of mit within English morphology. Thus, we find that English is not only relatively lacking in sublexical structure, but when such internal complexity does exist it is confounded by processes of historical change and language contact. So, if sublexical structure is to inform our conjectures about lexical semantics, we must look not only at languages with complex morphology but also for languages where the meaning/morpheme relation is as consistent as possible.

Such a language might get us further along the way in determining some universal set of lexico-semantic primitives. By lexico-semantic primitives we mean the universally most basic sublexical units which can be associated with some meaning—some linguistically relevant piece of cognitive or perceptual information. If crosslinguistic comparison of such morphologically rich/semantically consistent languages revealed that they tended to build words out of the same set of core morphemes, the existence of a set of lexico-semantic primitives would be all the more plausible. In such a study we would want to determine not only
which semantic notions are regularly morphologically encoded, but
even more importantly which ones are not. If such morphological
regularities were shown to exist, then presumably we could
determine which languages most overtly exemplify the unmarked, core
lexico-semantic/morphological units characteristic of human
languages. Were we successful at such a task, we could then use
the information provided by such languages to limit the possible
"semantic or thematic representations" which researchers in lexical
semantics could propose for languages like English; those which
exhibit very little sublexical structure and yet seem to provide
evidence that, although such internal lexical structure is not
overtly manifested, it does seem to play a role in characterizing
the behavior of certain verb types and verb classes. (For a
detailed analysis addressing specific words in English see
Jackendoff (1984a,b).)

This would constitute a valuable contribution to linguistic
theory since it seems that, at present, there is little limit
placed upon what semantic/thematic information, or even pragmatic
information, a lexical entry should include. For more extreme
analyses which suggest a need for such limitation see Schank (1972,
1973a, 1973b) and Wierzbicka (1972,1980) among others.

It is also necessary to put into perspective what, if any,
role sublexical semantic or thematic information plays in the
grammar as a whole. For the two extremes on this continuum of
investigation see Gruber (1976 [1965]) and Tálmá (1972) on the one
hand and Fodor, et al. (1980) on the other. For Gruber and Tálmá
sublexical semantic information is essential to the syntax. Fodor
seems to espouse the view that there is little of semantic relevance internal to the word and that investigation in this direction is a waste of time. Fodor et al. (1980) pointed out that a featural definition of words is useless, arguing that in the end every word will have its own feature to characterize it.

The situation is far worse. The labels for concepts we call words do not have a one to one relation to their referents. Oftentimes, a single label is used for multiple "words" which differ in their syntactic properties, their class membership, their meaning, etc. Just as a child might extend a single word like dog to mean all four legged animals, languages often allow a single label to cover more than one "word"; where word refers to some item specified in the lexicon without optional subspecifications of transitivity, complement taking abilities or interpretations. In other words, words with multiple subentries in the lexicon will often prove to be separate lexical items. How and why certain words, in the abstract sense, came to share a single label is yet another question. We eventually side with Fodor et al. (1980) in recognizing that in terms of word meaning or definition, sublexical structure is irrelevant. However, unlike Fodor et al. (1980) we will argue that there is much to be gleaned from an indepth analysis of sublexical structure, particularly when it comes to questions of polysemy like the one mentioned above.

When we accept the possibility that what we know about the world is independent of the linguistic devices we use to speak about that knowledge, several questions come to mind. How much information is built into human language directly, and how much is
left to be filled in by real world knowledge? Do humans choose to encode morphologically only certain aspects of the knowledge of the meaning of the objects and actions that surround them, or is any aspect of meaning open to an arbitrary morphological label? Clearly, this is an empirical question, one which should be of considerable interest to any linguist interested in cognitive science since it has the potential for yielding valuable insight into the interrelations between language, cognition and perception.

It is perfectly possible that one language might encode meaning in terms of color and light intensity, metaphorically extending such notions in the less obvious cases, whereas another language might rely upon shape and texture as the most salient notions upon which to found its meaning system. Likewise, it is possible to express the meaning of an object or an event in terms of a sound associated with it (onomatopoeia to the extreme)—this might be a particularly attractive option since the majority of the world’s languages use an oral/aural (or sound based) modality. A myriad of possibilities can be imagined, but one candidate has repeatedly caught the attention of semanticists from the time of the Byzantine grammarian Maximus Planudes to the most recent theories of lexical semantics (Gruber (1976 [1965], Jackendoff (1983), Anderson (1977), H. Clark (1973)). These approaches share a common fascination with the role that motion and location plays in the semantics of human language. It is this hypothesis about the core semantic notions in human language that we will explore, put into perspective and, hopefully, further motivate in this dissertation.
1.2 THEMATIC RELATIONS

Every theory relies to some degree upon thematic relations (thematic relations, theta roles, case relations in the sense of Fillmore (1968), semantic roles, etc.). Generally, they are arbitrarily specified in lexical entries. These entries address, for instance, what theta roles a given verb assigns or what kind of mapping there is between thematic relations and grammatical relations. The general need to include thematic information alongside grammatical relations in practically every natural language analysis demands more than a passing look at thematic relations and theta roles. In most recent theories theta roles themselves serve almost a diacritic function in the grammar. It matters little what the nature of the theta role is but more that there are enough distinct theta roles around to make theta theory, or one of its cross-theoretical counterparts, work.

Currently, little attention has been focussed upon what are possible theta roles and how they function, or if they function differently from one another. For example, are agent and patient theta roles? Are they the same as theta roles like source, goal or theme? What exactly is a theme? Does it have describable characteristics like sources and goals or is it some kind of default theta role? Why are there frequently dual specifications for certain arguments like agent-theme, patient-theme, agent-source? (See Jackendoff (1972), Chomsky (1981:139), Magnus (1984).) Does this duality, in conjunction with the fact that agent and patient seem to behave as two individual continua (causality/control and affectedness) indicate that we are dealing
with two different types of relations? All these and more questions will be addressed, but not necessarily definitively answered, in the chapters to follow. Let us first, however, review some of the issues which arise in the study of semantic/thematic roles. [5]

For nearly two decades, studies in linguistic semantics, as well as studies of developmental semantics, have appealed to notions such as agent, patient, source and goal. The need for such roles arises from the fact that in languages like English there is no fixed correlation between semantic/thematic roles and grammatical relations. One and the same role can be played by NPs bearing different grammatical relations. Furthermore, the same grammatical relations can exemplify quite different semantic roles in different sentences. Consider the following classic sentences taken from Fillmore (1968):

12. John opened the door with a key.
13. The door was opened by John.
14. The door opened with a key.
15. The key opened the door.
16. The door opened.

5. For the moment we will use a slash notation when referring to what have been called by some thematic roles, by others semantic roles and yet others deep cases.
"The door" is syntactically an object in the first sentence above and a subject in the second, but it has the same semantic role in both sentences, a role some have labeled "patient," and others have labeled "theme." "The key" is an instrument in all the sentences in which it appears, but it is a subject in the fourth sentence and a prepositional object in the others. On the other hand, the three NPs "John," "the key" and "the door" are the subjects of those sentences in which they are initial, but they play quite different semantic roles in those sentences. The exact specification of the roles they play is still open, but the most common candidates are: agent, patient/theme, patient/theme, instrument and theme, respectively.

Though the theory of semantic roles held out great promise for solving some previously intractible problems in semantics, it has fallen victim to two problems of its own: first, no one has been able to convincingly justify a single set of roles, and this has led to a great proliferation of different roles; second, it has turned out to be quite difficult, in the case of some sentences, to justify the particular assignments of semantic roles to particular noun phrases.

To illustrate some of these difficulties, let's consider one particular system, based on the notion "theme," originally proposed by Gruber and later extended by Jackendoff. This Gruber/Jackendoff system is currently widely appealed to in work in generative grammar. The notion "Theme" is defined as follows:

- 36 -
THEME:

The Theme is the semantic role of the NP that names the entity that moves in the case of a sentence with a verb of motion or the NP that names that entity which is located in the case of a sentence with a verb of location.

"Theme" is an unfortunate choice of terms. Others have referred to essentially the same role by the term "figure" (as opposed to "ground." (See Talmy (1978, 1983).) Besides the notion "theme," roles like agent, patient, source, path and goal are appealed to as well.

Several assumptions concerning the properties of semantic/thematic roles are prevalent. A widely shared assumption appears to be that all sentences are required to have a theme. This has lead to a weakening of the definition of "theme" which generally assumes the theme to be the NP which moves or is located. As a default case, the role theme is also assigned to the only NP in a sentence with a single syntactic argument. There is not much evidence in favor of this weakening of the notion theme, nor for the requirement that every sentence is required to have a syntactic theme. Consider the following set of sentences:

17. Mary slapped Bill.

18. Mary impressed Bill as sad.
19. Mary robbed Bill.

20. Mary kicked John.

21. Mary kicked John into the bedroom.

In "Mary slapped Bill," what moves (and is thus the Theme) is a slap, not Bill. Thus, the theme is not an NP in the sentence, but rather is incorporated into the verb. In the next sentence, what is transferred to Bill is again not named by an NP in the sentence, but rather has to be constructed out of discontinuous pieces of the sentence: "an impression (image) of Mary as sad." In "Mary robbed Bill," it is not at all clear that there is a theme in the sentence, even incorporated into the morphology of the verb. Rather, we simply understand it as part of the meaning of the verb, as "something valuable." Note that a theme can be added in an of-phrase: "Mary robbed Bill of his pride." Notice the progression among the following three sentences:

22. Mary stole money from John.
   THEME

23. Mary stole from John.

24. Mary robbed John.

This progression seems to make it obvious that John is not the theme in "Mary robbed John." Thus, we must either allow an implicit theme argument, or reject the notion that every sentence requires a theme. In "Mary kicked John," the theme appears to be a kick and is contributed by the verb. John is either a goal or patient (or
both). However, in "Mary kicked John into the bedroom," John does name an entity that moves and is generally labelled as a theme. In fact, in this sentence, John seems to be assigned two distinct theta-roles. The verb seems to assign "John" the role of patient/goal and the preposition assigns this NP the role of theme. The theme associated with the verb, by analogy with the sentence "Mary kicked John," would be "a kick." The goal associated with the preposition into would be the bedroom. This final example also stands as a counterexample to the next prevalent assumption we will address.

Much current work also assumes that an NP argument can bear only one semantic/thematic role. This second assumption follows from what appears to be a misinterpretation of the Theta Criterion as it is proposed in Chomsky (1981; henceforth referred to as LGB). In Chapter 2 of LGB, Chomsky, extending the conditions of functional uniqueness and functional relatedness from Frieden (1978), proposed a formulation of the theta-criterion which explicitly required a one-to-one relation between theta roles and NP arguments. That statement is given below:

Each argument bears one and only one θ-role, and each θ-role is assigned to one and only one argument.

[Chomsky (1981:36)]

Chomsky (1981:139) himself notes the drawbacks of this formulation, citing the following example from Jackendoff (1972) where John is assigned two theta-roles, agent and theme: "John deliberately rolled down the hill." The sentence "Mary kicked John into the
bedroom" constitutes yet another problematic example. In this sentence, two different governors appear to assign a theta-role to the same NP. As we pointed out earlier, the verb appears to assign John the role patient (or goal), and the preposition assigns this same NP the role of theme. It, furthermore, looks as if prepositions can assign theta-roles to "subjects," and not just mark the theta-roles of their complements (i.e., ...John (theme) into the bedroom (goal).

Chomsky's final revised statement of the Theta Criterion in Chapter 6 of LGB leaves open the possibility that a single NP can be assigned two different theta roles. That statement of the Theta Criterion appears below:

\textbf{Q-criterion:} Given the structure } S, \text{ there is a set } K \text{ of chains, } K = \{ C_i \}, \text{ where } C = (a^{i_1}_1, ..., a^{i_n}_n), \text{ such that:}

(i) if } a \text{ is an argument of } S, \text{ then there is a } C_i \in K \text{ such that } a = a^{i_j}_j \text{ and a } \Theta \text{-role is assigned to } C_i \text{ by exactly one position } P.

(ii) if } P \text{ is a position of } S \text{ marked with the } \Theta \text{-role } R, \text{ then there is a } C_i \in K \text{ to which } P \text{ assigns } R, \text{ and exactly one } a^{i_j}_j \text{ in } C \text{ is an argument.}

[Chomsky (1981:335)]

Under the second formulation of the Q-criterion, theta-role assignment is a property of chains. Thus, if a single NP is a
member of two separate chains, it has the possibility of receiving
two distinct theta-roles. It is this formulation of the
Q-criterion which we will assume here.

The requirement on one-to-one mapping between theta roles and
NP arguments is adhered to by neither Gruber nor Jackendoff. For
them, however, theta-roles/thematic relations play a much more
extensive role in the lexical semantics of verbs. The same is true
in the work of Carter (1984). For Chomsky, theta-roles are
restricted to arguments which play a part in the syntax. We hope
to use evidence from ASL, a language which overtly marks thematic
relations sublexically and syntactically, to tease out the
lexico-semantic vs. syntactic properties of thematic relations,
and to argue that sublexical elements which appear morphologically
to be assigned specific theta-roles have the property of idiom
chunks. They do not behave as syntactic arguments. We will argue
that this analysis has ramifications for the analysis of English as
well, and can shed some light on what have been assumed to be
"semantic or conceptual representations" of lexical items and have
the peculiar property of being exempt from the theta-criterion and
the projection principle. Our remarks will address most directly
the work of Jackendoff (1983; 1984a,b) and Carter (1984).

Another assumption crucial to the Gruber/Jackendoff system of
semantic relations is that the notion theme, as well as the
locative roles like source, path, location and goal can be
figuratively extended to cover domains other than literal motion
and location. For example, figurative motion is involved in the
transference of something in the abstract domain of possession, or
in change from one state to another; where states such as illness or health, red or blue, hot or cold, solid or liquid are seen as figurative locations. Some simple assignments are given below:

25. John is in Africa.
   T    LOC

26. John is sick.
   T    LOC

27. The car drove to the dump.
   T    GOAL

28. John drove the car to the dump.
   A    T    GOAL

29. John handed a gift to Mary.
   A    T    GOAL

30. John willed his fortune to the university.
   A/SOURCE     T    GOAL

31. The car turned into the driveway.
   T    GOAL

32. The metal turned hot.
   T    GOAL

33. John kept the book on the shelf.
   A    T    LOC

34. John kept the book.
   A/LOC     T

Figurative extension of motion/location to more abstract domains is central to the locative hypothesis, but it is often difficult to motivate in a language where the extended examples bear little
phonological or morphological similarity to their motion/location counterparts. We will examine the process of figurative extension in ASL, a language where motion/location forms and their figuratively extended counterparts in other semantic fields are near homonyms of one another and where the morphological similarities between such related forms are directly observable.

Not all assignments of thematic relations are straightforward. Furthermore, difficulty in determining the thematic role assignments is not necessarily correlated with the degree of abstraction away from pure motion/location expressions. It has more to do with the type of roles involved. The problems that arise in the Gruber/Jackendoff system arise, in one form or another, in almost all others. The notion of an agent, though it appears in all deep case/semantic/thematic role systems, is particularly problematic. Consider the sentences below:

35. John hit Harry.

36. John rolled down the hill for the fun of it.

37. The wind opened the door.

In the sentence "John hit Harry," John is invariably identified as an agent. Yet this sentence does not necessarily entail that John intentionally hit Harry, or even that he exerted very much control. John could have been swinging his arms while exercising and, oblivious to the situation, inadvertently hit Harry. In the next
sentence, "John" is an "agent/theme." It is a matter of some controversy whether this is a role separate from agent and theme or the combination of the two. Notice that this sentence is nearly equivalent in meaning to the following sentence, which indicates the likely independence of the two roles:

38. John rolled himself down the hill.

Finally, in "The wind opened the door," the wind is neither an agent nor an instrument. Perhaps, we need to invent a new role for it—"natural force" for instance. We will adhere to the conviction that the proliferation of roles is costly and to be avoided. We will not spend a lot of time arguing for this position.

The notion of patient is equally troublesome. According to some accounts, the syntactic objects of the following three sentences have been labelled respectively as recipient, theme, and patient or goal, while other analyses have seen them all as patients.


40. John opened the door.

41. John kicked Bill.

Patient is a role which can be discarded. Much as "ground" serves to label those locative roles which are not "figure," "patient"
labels a subset of the roles which are not "agent;" particularly, non-agentive themes, affected elements and recipients or sentient goals.

Roles like agent and patient are fundamentally different in nature from the true locative roles like source, goal, location and theme, in the sense that agent and patient label independent continua along which we can place entities which are more vs. less agentlike (volitional) or more vs. less patientlike (affected). The notions agent and patient do not lend themselves easily to definition. They seem most relevant to roles assigned to humans or personified entities. They are often associated with another thematic relation: agent/theme (walk, stand up, run), patient/theme (fall, die, trip), agent/source (give, throw), agent/goal (accept, ingest), patient/source (invite) or patient/goal (hit, kick).

We will argue, bringing to bear evidence from ASL, that a distinction needs to be made between roles like agent and patient and the set of locative relations. We will refer to the first set as semantic roles, and the second set as thematic roles. The term theta-role (θ-role) will be more specific than thematic role, since it involves the assignment of both the locative roles and the agent role. Hopefully, however, the distinction we make between semantic and thematic roles will shed some light on the special properties of the agent theta-role, its strong association with subject position, and the means by which it is assigned to its NP. ASL has several distinct markers of agency and causation/control: a set of handling classifiers which indicate direct causation by an agent, a
set of causative verbs which indicate indirect causation by an agent, and a set of role prominence markers which are co-indexed with agents in the unmarked case, but play a complicated role in the grammar which is more broadly associated with notions ranging from causality and control over events to awareness of or an association with an event (as in the case of an ethical dative). Agency and causality are notions which don't yield easily to locative based encoding, thus they prove to be an interesting testing ground for the locative hypothesis.

In figuratively extended verb classes, like verbs of vision or perception, even the assignment of simple locative notions can be difficult. The English sentence "John saw the book" has been assigned a bewildering array of case frames. The subject has been assigned the roles of experiencer, source, goal, and agent; the object has been assigned the roles of source, goal, theme, and patient. ASL possesses a rich system of locative based perception verbs, each with a complex sublexical structure. The internal morphology of these lexical items reveals the myriad of possibilities for the locative encoding of perceptual notions, making more understandable the abundance and variety of proposed analyses for a single word such as see in English.

In subsequent chapters, we will address the entire range of questions regarding thematic and semantic roles which were raised above in relation to ASL, a language which is indisputably locatively based and which overtly expresses locative/thematic relations at every level of its grammar. It is not only morphologically complex with an intricate sublexical structure, but
it also uses locative information to indicate grammatical agreement, co-reference and even discourse anaphora. It unambiguously marks not only sources and goals, but also has an obligatory morphological position for themes, a thematic role which in English must generally be inferred; and, which enjoys the status of most inconsistently identified thematic role across any given set of analyses. As such, it offers not only insight into the nature of thematic roles and the role they play in universal grammar (UG), but also offers positive support for notions of motion/location as the perceptual and cognitive primitives to which the linguistic system links and upon which it is founded.

1.3 THE LOCATIVE HYPOTHESIS

The "locative hypothesis" is one of the longest standing hypotheses in linguistics: it states that spatial expressions are more basic, grammatically and semantically, than various kinds of non-spatial expressions. They are more basic in the sense that they serve as "structural templates" for the construction of other grammatical systems and semantic structures (Anderson (1971), Gruber (1976 [1965]), Jackendoff (1972, 1978), Lyons (1977), Traugott (1974, 1975, 1977, 1978). Such grammatical systems as tense and aspect, as well as various grammatical cases and thematic roles, and such semantic domains as possession, state, quality/property, existence, quantification and modality have been shown in language after language to be founded upon the basic notions of location and change of location. In its strongest versions, the locative hypothesis constitutes a profound conjecture
about the fundamental nature of human language, and by extension, human cognition.

Our goal in the next section is to reacquaint readers with the Locative Hypothesis and the issues which it raises. Our ultimate goal is to present a locative based analysis of American Sign Language within what might be broadly defined as the Government and Binding (GB) framework, raising issues which hopefully may lead to subsequent reconsideration of the role of locative relations in languages like English where such relations do not yield to direct observation.

Before turning in detail to the locative nature of ASL, we will introduce the Locative Hypothesis and explore some of the arguments which have been offered in support of it. Here we will draw primarily on examples from Jackendoff and Gruber, but we recognize the vast literature in this area which no single review, even one of dissertation length, could truly do justice. (See Anderson (1971,1977) and Jackendoff (1983) for a more extensive review of this literature.

The basis of language is location and change of location (movement). Spatial expressions are more basic than non-spatial expressions in the sense that they serve as "structural templates" for the construction of other grammatical systems and semantic structures. This in a nutshell is the Locative Hypothesis.[6]
The earliest attempt to develop a locative based theory has been attributed to Maximus Planudes. Hjelmslev's (1935) account of Planudes' analysis of the Greek case system and his own analysis of the same data gives not only a concise illustration of the locative hypothesis, but also includes an extensive survey of the various issues involved in the locative vs. non-locative debate.[7]

From my own superficial perusal of the literature, it appears that every language offers, to some degree, support for the locative hypothesis. Studies range from analyses of languages where evidence of the locative base of language is directly observable and permeates the morphology and syntax of the language to analyses which tease out the locative basis of a language by more indirect means, arguing that it plays an important role in the cognitive representation, mental representation or semantic representation of language.

Casad and Langacker have written numerous articles on Cora, a language of western Mexico which has an elaborate system of locationals which interact with many areas of the syntax. (See Casad (1977, 1982) and Casad and Langacker (1982).) Gee and Kegl

6. The Locative Hypothesis goes by a variety of labels: "the Localist Hypothesis" (Anderson 1971), "the Thematic Relations Hypothesis" (Jackendoff 1983), etc.. I will use yet another label here in the hopes of remaining theory neutral.

7. Anderson (1971:3-13) succinctly states the locative hypothesis (in his terms, the Localist Hypothesis) and cites the writings of numerous 19th and 20th century locative grammarians. Anderson's two books (1971, 1977) on the grammar of case provide an excellent example of a treatment of English within this tradition.
(1982, 1983a, 1983b) and Kegl and Gee (1983) argue that the entire grammatical system of American Sign Language is locatively based and that this locative information is directly observable in the phonetics, morphology and syntax of the language. Such studies provide tangible evidence for the locative hypothesis.

The work of Gruber (1976 [1965], 1984), Jackendoff (1972, 1976, 1978, 1983), Anderson (1971, 1977), Talmy (1983) and Carter (1976, 1978, 1984) have proposed that locative notions play a central role in cognitive or semantic representations for English. However, in English and languages like it the locative information does not generally yield to direct observation. These studies provide indirect evidence for the locative hypothesis.

Only one set of articles (see Brugman (1983, (to appear))) argues directly against the locative hypothesis, claiming to have a language which in no way utilizes a locative base. Since such a position would directly challenge this thesis in the sense that the locative based system in ASL would be relegated to a language specific phenomenon, which it shares in common with the bulk of other languages which have been analyzed to date, but which would be in no way universal, I will devote a little time to presenting Brugman's position and how I see it as support for, not evidence against, the locative hypothesis.

Brugman's evidence is drawn from a dialect of Mixtec spoken in the small village of Chacaltongo. In this language, words for body parts are used for the purpose of referring to locational, and sometimes more abstract, relationships between an object or event
and a location. Such a phenomenon is not only exhibited among other members of the Otomanguean language family, but shows up in many languages of Africa and the New World. (For a review of the literature on universals and body part terminology see Andersen (1978).) What is remarkable about Mixtec is that relational concepts in this language are expressed purely through a body part based system, with "no grammatical devices resembling the Indo-European ones of case marking, prepositions or postpositions." (Brugman (to appear, p. 2) The conclusion Brugman comes to as a result of her findings is stated below:

Another major conclusion to be drawn from the phenomena discussed here is that, since this grammatical subsystem does not at all resemble the system of spatial relations as expressed in Indo-European languages, this is a major area of grammatical knowledge and corresponding conceptual organization which cannot be universal. It is often assumed that locational relationships, as expressed for instance by English in, under, to, and so on, are universal semantic primitives. But the phenomena described here show that such a position cannot be countenanced.

[Brugman (to appear, p. 3)]

It is true that this dialect of Mixtec overtly lacks locative/spatial expressions, although Brugman notes (footnote, p. 2) that it may be that this language is developing a prepositional system. Two of the three prepositional morphemes are apparently derived from body part terms, but the youngest speakers do not recognize the body part use of these morphemes. Nonetheless, the lack of overt locative/directional morphemes in this language does not argue against the locative hypothesis, as Brugman assumes, but rather gives strong evidence for it.
The following set of examples illustrate exactly how body-part morphemes indicate locative relations. The relevant morphemes are: nda?e 'hand/arm', si?ki 'animal back,' nüü 'face,' ñini 'head' and ñii 'belly.' These body-part morphemes occur in nominal compounds which behave much like preposition+nominal constructions in Mixtec. Notice that in each case the inferred relational marker is stative (i.e., in, on, under).

42. ndukoo - ri nda?a - yunu
    be+seated - I arm - tree

    'I am sitting on the branch of the tree'

43a. *se?e - ri hitu si?ki - yuu
    son - I lie animal+back - mat

    'My son is lying on the mat'

43b. se?e - ri hitu nuu - yuu
    son - I lie face - mat

44a. se?e - ri hitu si?ki - mesa
    son - I lie animal+back - table

    'My son is lying on the table'

44b. se?e - ri hitu nuu - mesa
    son - I lie face - table

45. ni - ndukoo - ri si?ki - hika - Be?e
    past - be+seated - I animal+back - wall - house

    'I was sitting on the wall of the house'

46. hiyaa - re si?ni - yuku
    be+located - he head - mountain

    'He is located on top of the mountain'

- 52 -
47. ni - kaa - ri siki - 3e?e
past - be+located - I animal+back - house
'I am on the roof'

48. isu - wa sa?a ?n yaw cii - yunu wa
rabbit - det. make a hole belly - tree det.
'The rabbit is digging a hole in the tree trunk'

49. hindi - ri nuu - mesa
stand - I face - table
'I am standing in front of the table'

As we see in the above examples, body parts serve as classifiers for specific shapes, locations on objects (top, bottom, etc.) and prominent surfaces (front, back, etc.). Interpreting any of these Mixtec sentences involves inferring the unspecified locative relation from the combined characteristics of the verb and the nominal compounded with the body-part morpheme. For example, one can lie "animal+back" on a table, but not on a mat. This presumably follows from the nature of sâkâ ("animal back") and the set of three dimensional objects with a horizontal upward facing flat surface which it picks out—a set which includes tables, but not mats. It is the verb hitu ("lie"), and not either of the body part morphemes sâkâ 'animal back' or nûn 'face,' which somehow indicates the relation ON. The body part morphemes have only the potential for being involved in a contacting relation. This can be seen when we examine the same body part morpheme as it co-occurs with two different verbs—one which requires an "on" relation with the classified nominal and the other
which does not. Consider the following two sentences involving the body-part morpheme, \textit{nuu} 'face', and the two verbs, \textit{hitu} 'lie' and \textit{hindi} 'stand':

\begin{verbatim}
44b. se?e - ri hitu nuu - mesa
    son - I lie face - table

'My son is lying on the table'
\end{verbatim}

\begin{verbatim}
49. hindi - ri nuu - mesa
    stand - I face - table

'I am standing in front of the table'
\end{verbatim}

The body part morpheme \textit{nuu} is the same in both cases, but in one sentence it involves contact ("on the surface of") and in the other case it does not ("in front of"). These body part morphemes give information regarding location, but not necessarily the locative relations. Such information comes from the interpretation of the verb or from the context. It is important to note that the two sentences above can, given the proper context, have either the "on the surface of" or the "in front of" reading. The translations are the preferred readings out of context. In instances where a body part morpheme can be involved in a variety of locative relations and the verb is not itself specified for one particular relation, a variety of readings are possible. The verb \textit{ndebi} 'fly' allows a variety of locative relations, as does the body part morpheme \textit{hini} 'head.' Thus, the following sentence is two ways ambiguous:
50. ni - ndeci ?n saa sini - yunu
past - fly one bird head - tree
'The bird flew to the top of the tree'
'The bird flew over the tree'

Perhaps a better interpretation of the sentence out of context would be: 'The bird flew in some relation to the top of the tree.
The locative relation, the relation held at the relevant anchor point of the movement or act of being located is left unstated. Some languages like Cebuano have a single classifier which classifies all objects rather than the typical situation where a variety of classifiers categorize smaller sets of objects (see Greenberg (1972:8). In Mixtec, there seems to be a single zero-morpheme which marks all secondary locative relations (IN, ON, UNDER, OVER, etc.). We fill in what we know about objects and possible relations.

What is interesting to note is that this variety of possible relations has its limits. The inferred locative relations are drawn from a small set of possible unmarked relations which it just so happens coincides with the types of locative relations marked by prepositions, postpositions or locative verbs, croslinguistically. One could say that the hearer simply falls back on real world or perceptual knowledge in these cases in order to interpret the sentence. This is true, but the default interpretations are the kinds of locative relations languages encode and not ones that they do not. The tie between perceptual knowledge and linguistic encoding is at the heart of the locative hypothesis.
This entire process brings to mind E. Clark's (1973, 1979) studies of the acquisition of the prepositions *in*, *on* and *under* in English. She gives evidence for a prelinguistic organization of knowledge that provides a foundation upon which language is built. H. Clark (1973) explicitly argues that this prelinguistic knowledge is based on the child's innate knowledge of space. His discussion of P-space (perceptual space) and L-space (linguistic space) offers yet another statement of the locative hypothesis:

The child is born into a flat world with gravity, and he himself is endowed with eyes, ears, an upright posture, and other biological structure. These structures alone lead him to develop a perceptual space, a P-space, with very specific properties. Later on, the child must learn how to apply English spatial terms to this perceptual space, and so the structure of P-space determines in large part what he learns and how quickly he learns it....Since this is so, the concept of space underlying the English spatial terms, to be called L-space, should co-incide with P-space.

[H. Clark, (1973)]

H. Clark later argues that P-space is a prerequisite for the acquisition of not only spatial and temporal terms, but a good part of the rest of language by metaphorical extension of space to other domains. Since P-space is the same for all humans, there is no need to restrict this claim to English. H. Clark goes on to argue that the basic notion of P-space is locating something with respect to a reference location. A more detailed discussion of the Clark and Clark evidence with specific relation to ASL appears in Bernstein (1980), Gee and Kegl (1982a:202-206) and Kuhl (1982). We will include some of that discussion here, but will focus a bit
more on E. Clark's research concerning the acquisition of locative prepositions: *at, in, on* and *under*.

E. Clark found that children use and correctly respond to words like *in, on* and *under* long before they really understand them in any linguistic sense. They basically rely on perceptual knowledge and a knowledge of what one does with objects to respond to requests like "Put the baby *in* the crib" or "Put the cup *on* the table." They respond incorrectly to requests like "Put the baby *under* the crib" or "Put the cup *in* the table" (even when the table has a drawer). They respond by performing the unmarked action associated with the object referred to; ("in-ning" in the case of cribs and "on-ning" in the case of tables. Bernstein (1980), in a replication of the Clark and Clark studies on the acquisition of *in, on* and *under* with Deaf children learning ASL, cites cases where children went out of their way to perform an action that is functionally related to the object in question. In one instance, a child was asked to put an object *on* a box—an object which in the unmarked case has things put *in* it rather than *on* it. The box was sealed and, therefore, did not allow the unmarked action of putting something into it to be performed. The child turned the box repeatedly, searching for an opening, and eventually punched a hole in the box and put the object "into" rather than "on" it. Even prior to this point in their development, given non-functional objects, children in playing with these objects, will physically try to put things *"in"* something which is container-like and put things "*on*" something which has a prominent horizontal surface. Given both choices, *"in"* seems to win out. At this point the
prepositions have no distinction for the child. They are much like our proposed "zero-morpheme of relation" in Mixtec. Later the child begins to distinguish the English relation markers and makes the link between English labels for locative relations and perceptual/cognitive locative relations. We see, however, very early on that these children have an innate set of salient locative relations just waiting to be mapped onto language.

There has been a long standing debate as to the markedness ordering among English prepositions and the order in which they are acquired. See E. Clark (1973) and the large body of literature that has followed from that paper. Order of acquisition does not necessarily follow the markedness hierarchy. H. Clark postulated the following markedness relations among English prepositions, where less marked notions are semantically less complex that more marked notions:

<table>
<thead>
<tr>
<th>CLARK'S MARKEDNESS RANKING AMONG PREPOSITIONS</th>
</tr>
</thead>
</table>

[least marked]

'at' = general location

'in/on' = location plus dimensionality

'to' = location plus direction/movement

'into/onto' = location plus dimensionality plus direction/movement

'from' = negative

'off of/ out of' = negative with respect to assumptions directionality

[most marked]

In English, the order of acquisition would not appear to support this
markedness continuum. The prepositions in and on are first to occur, and the prepositions at and to (the prototypical markers of stasis and movement) are acquired quite late. Notice that English prepositions are like case markers on nouns. They case mark and assign thematic roles to noun arguments in much the way verbs case mark and assign argument relations to their arguments. The preposition to is the marker of positive movement. Motion, following E. Clark, is the prototypical verbal notion. Thus, it is not surprising that to (the preposition) is acquired late as a case or thematic role assigner in English. It shows up initially as the verbal element go. The English preposition at is also late as a word, despite being the least marked notion and thus the one we would expect to be first. However, what we find in children's early utterances is that location is encoded quite early by the simple juxtaposition of the related elements (e.g., "Lotion tummy" or "Baby highchair"). Again, this looks much like a zero-morpheme marking locative relations. In this sense, at occurs as early as or, more likely, predates the appearance of in and on. At this stage, the "zero-morpheme" is neutral with respect to the locative relations held at the relevant reference location. The appearance of in and on allow overt differentiation of three terminal locative relations. Later come more complex forms like under or above which indicate a second location relative to the reference point.

It seems plausible that a language like Mixtec, with a rich inventory of body-part morphemes which functions much like a classifier system, could communicate reasonably well, even with only one neutral/locative morpheme. Classifiers give enough extra information about a noun to aid in narrowing down the set of possible
locative relations in which any given nominal can participate. Objects with flat surfaces (vertical and horizontal) tend to be contacted (i.e., ON). Objects with apertures tend to be entered (i.e., IN), and so on. A language with a rich classifier/body-part system (like Mixtec), which as we can already see from the examples distinguishes stasis vs. movement in its verbs, could use a single neutral term to mark the other relations. This term could even be absent leaving only the juxtaposition of nominals, much like the behavior of the verb "to be" in a language like Russian. It not only supports the locative hypothesis, but gives us useful insights into the markedness properties of these locative relations. Furthermore, Brugman's discovery of the essential role played by body parts may also prove to be relevant to more than just a subset of the world's languages. Recent experiments by Rimor (forthcoming) have revealed that not only motion/location, but also body part notions play a surprisingly central role in the semantic organization of verbs in the English lexicon. And, Gee and Kepl (1982a,b; 1983a) and Dexter (1982, 1983) have shown the association with body parts to be crucial to the process of metaphorical extension in ASL and have indicated that the same is true crosslinguistically. Although we recognize the central role of body parts in the set of potential lexical primitives, our focus here will be on motion and location.

1.3.1 Figurative Extension

Let's begin our overview of evidence for the locative hypothesis by exploring some of the parallels between the semantic field of motion and location and other semantic fields. Talk about time, for
example, is derived from talk about space. In the examples below, times serve as locative arguments of verbs and prepositions—locations, sources and goals. (for discussion see Anderson 1971, H. Clark 1973, Jackendoff 1983).

<table>
<thead>
<tr>
<th>TIME</th>
<th>SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>at 6:00</td>
<td>at the corner</td>
</tr>
<tr>
<td>from Tuesday to Thursday</td>
<td>from Denver to Chicago</td>
</tr>
<tr>
<td>in 1976</td>
<td>in Cincinnati</td>
</tr>
<tr>
<td>on my birthday</td>
<td>on the table</td>
</tr>
<tr>
<td>into the evening</td>
<td>into the room</td>
</tr>
<tr>
<td>toward evening</td>
<td>toward New York</td>
</tr>
<tr>
<td>within the hour</td>
<td>within the box</td>
</tr>
<tr>
<td>around 10:00</td>
<td>around the house</td>
</tr>
<tr>
<td>stay beyond 5:00</td>
<td>stand beyond the field</td>
</tr>
<tr>
<td>continue up to 10:00</td>
<td>walk up to the door</td>
</tr>
<tr>
<td>an hour behind</td>
<td>ten feet behind</td>
</tr>
<tr>
<td>approach evening</td>
<td>approach the door</td>
</tr>
<tr>
<td>enter the New Year</td>
<td>enter the room</td>
</tr>
<tr>
<td>between 5:00 and 7:00</td>
<td>between the rock and the tree</td>
</tr>
</tbody>
</table>

Sources, goals and locations are labelled in the following examples:

- at six o'clock
- at the corner
- location
- location

- from Tuesday to Thursday
- from Denver to Chicago
- source
- goal
- source
- goal

- approach evening
- approach the door
- goal (of direction)
- goal (of direction)

There is yet another locative role which is not represented in the
above examples. It is also possible for time to be the moving or located element (the theme) of the verb. The following examples illustrate time in the theme role:

<table>
<thead>
<tr>
<th>TIME</th>
<th>SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday crept by.</td>
<td>The freight train crept by.</td>
</tr>
<tr>
<td>Christmas is fast approaching</td>
<td>The tiger is fast approaching.</td>
</tr>
<tr>
<td>Five o'clock came and went.</td>
<td>The doctor came and went.</td>
</tr>
<tr>
<td>The evening is upon us.</td>
<td>The blanket is upon the bed.</td>
</tr>
<tr>
<td>Noon is in the middle of the day.</td>
<td>The couch is in the middle of the room.</td>
</tr>
</tbody>
</table>

One important piece of the argument for the locative hypothesis is the fact that although time and space are both cognitive and perceptual primitives, time is generally encoded in terms of space and not the other way around. This asymmetry holds crosslinguistically. Thus, language seems to favor one set of cognitive primitives over the others as its choice for the lexical primitives which are used to encode all other notions, where "encode" means label and has no overriding implications for, nor puts any limitations on, the actual meaning of such notions.

Perhaps the most compelling support for the Locative Hypothesis, though, comes from the fact that all languages figuratively extend spatial position and movement to express abstract semantic domains. There are numerous examples which transparently exemplify such

8. Remember that we are using here a strictly locative definition of theme. The theme is that element that moves with respect to a verb of motion (or directional preposition) or whose location is asserted in a verb of location (or locative preposition). In many theories the notion of theme has been radically extended. In these cases it has become no more than a default diacritic label.
figurative extensions. Consider the following examples from three abstract semantic domains (Cognition, Perception, and Emotion):

**COGNITION:**
- hold onto that line of thought
- keep something in mind
- put an idea into someone's head
- put thoughts out of one's head
- to search through one's memory
- to have a thought in the back of one's mind

**PERCEPTION:**
- keep your eyes on that
- to have an eye on
- put a good word in someone's ear
- music entered my ears
- a car came into my line of sight
- the book was out of sight

**EMOTION:**
- to feel down
- to be up in spirits
- a feeling came over me
- to hold in one's anger
- to have joy in one's heart
- to be under a great strain

Of course, those semanticists who assume the locative hypothesis propose a locative based semantics designed to handle not only the transparent cases, but also the semantics of the less obvious cases—those where there is no direct lexical evidence of figurative extension. Jackendoff, for example, gives the following sets of examples to illustrate the extension of basic motion/location expressions to more abstract domains. He characterizes three verb types (GO, BE, and STAY type verbs) which occur in each of the semantic fields exemplified below (spatial location, possession and property/quality):
SPATIAL LOCATION:

a. GO: The train went from Detroit to Boston.
b. BE: Max was in Africa.
c. STAY: Stanley stayed in Africa.

POSSESSION:

a. GO: Harry gave the book to the library.
b. BE: Max owned an iguana.
c. STAY: The library kept the book.

PROPERTY/QUALITY:

a. GO: The metal changed from black to red.
b. BE: The metal was red.
c. STAY: The metal stayed red.

Although the actual lexical items (went, gave, change) vary, Jackendoff, following Gruber, argues that their semantic representations are actually very similar. All three are GO-type verbs. Below are the three representations Jackendoff would assign to the GO-type sentences mentioned above:
51. The train went from Detroit to Boston.

[ \ GO ([TRAIN], \ FROM ([DETROIT]) \])
   \ TO ([BOSTON]) \]
   \ path

52. Harry gave the book to the library.

[\ CAUSE ([HARRY], \GO ([BOOK], \ FROM ([HARRY]) \])
   \ TO ([LIBRARY]) \]
   \ path

53. The metal changed from black to red.

GO ([METAL], \ FROM ([RED]) \]
   \ TO ([BLACK]) \]

The verbs in the above sentences are semantically decomposed into a verb (GO), some theme (BOOK, TRAIN, METAL), a source (DETROIT, HARRY, RED) and a goal (BOSTON, LIBRARY, BLACK). Jackendoff assumes the Thematic Relations Hypothesis which is his interpretation of Gruber's basic insight concerning the semantics of motion and location as the key to a wide range of further semantic fields. This version of the Locative Hypothesis is stated below:
Thematic Relations Hypothesis (TRH)

In any semantic field of [EVENTS] and [STATES], the principle event-, state-, path-, and place-functions are a subset of those used for analysis of spatial location and motion. Fields differ in only three possible ways:

a. what sorts of entities may appear as theme;

b. what sorts of entities may appear as reference objects; [9]

c. what kind of relation assumes the role played by location in the field of spatial expressions.

Jackendoff characterizes different semantic fields in terms of what abstract notions play locative roles. The temporal field which accounts for the temporal expressions exemplified on page is stated below. Note, however, that this characterization of a Temporal Field does not cover the examples like those on page where [TIMES] appear as themes. A characterization of the Temporal Field which would handle these cases is easily constructible and still follows naturally from the Thematic Relations Hypothesis.

Temporal Field:

a. [EVENTS] and [STATES] appear as theme.

b. [TIMES] appear as reference object.

c. Time of occurrence plays the role of location.

[Jackendoff 1983:189]

9. "Reference object" refers to the object of a preposition as in "on the table." The place referred to is distinct from the reference object since it can refer to a variety of places ("near the table," "on the table," "inside the table") holding the reference object constant (see Jackendoff 1983:161).
Similar characterizations describe the extension of motion and location to fields of alienable possession (as in "Harry gave the book to the library.") or identification (as in "The metal changed from black to red."

Alienable Possession:

a. [THINGS] appear as theme.

b. [THINGS] appear as reference object.

c. Being alienably possessed plays the role of location; that is, "y has/possesses x" is the conceptual parallel to spatial "x is at y."

[Jackendoff 1983:192]

Identificational Field:

a. [THINGS] appear as theme.

b. [THING TYPES] and [PROPERTIES] appear as reference objects.

c. Being an instance of a category or having a property plays the role of location.

[Jackendoff 1983.194]

The Thematic Relations Hypothesis is an appealing notion. If it is correct, it could be valuable as a research strategy for analyzing the semantics of natural language. It predicts that even the most abstract semantic concept must be statable in the form of a motion/location expression.
1.3.2 Problems With Semantic Representations

Propositions, even semantically extended ones, can be semantically transparent to varying degrees. A semantically transparent sentence is one in which the motion/location template is recoverable from the surface form. For example, sentence (a) below is more semantically transparent than sentence (b).

54a. The metal went from solid to liquid in a matter of minutes.

54b. The metal melted in minutes.

Jackendoff would assign both these sentences the same semantic representation:

54c.  

[GO ([METAL], ident)  
				FROM ([SOLID])  
					ident]  
						|  
						|  
				| TO ([LIQUID])  
					ident]  
					ident  

[Jackendoff 1983:195]

Most of the examples we have discussed thus far are relatively transparent. Semantic decomposition becomes more and more speculative as we move away from the transparent examples.
The sentences above are decomposable into a verb (GO), a theme (METAL), a source (SOLID) and a goal (LIQUID). Notice that source and goal are actually secondary notions. **Source** is the name for the location associated with **FROM**. **Goal** is the name for the location associated with **TO**. The thematic role of an argument is completely determined by the motion/location element (verb or preposition) with which it co-occurs. Therefore, any verb that takes several thematic arguments must be decomposable into several motion/location phrases. [10]

Some verbs like **melt** decompose into a source and goal clause even when there is no prepositional phrase associated with them. Notice that in this case, the verb cannot co-occur with additional source and goal clauses:

55. *The metal melted from solid to liquid.*

The verb **give**, for example, decomposes into a representation containing a **FROM** phrase even though the verb never co-occurs with

10. A possible exception to this is the thematic role, theme. For Jackendoff, it is the argument of a **GO**. **BE** or **STAY** verb. However, as we will propose in Chapter 3 each verb may take two distinct arguments: a locative argument, which serves as the anchor point of the motion, location or orientation of a locative verb or preposition; and a theme argument which has no static locative meaning, but rather is a nominal element whose position or movement is coincidental with the motion/location element. In "John went to the store," **John** is coincidental with the movement **TO**. It has no fixed location. In "John is in the corner," **John** is coincidental with **IN** and only has a fixed location as a consequence of the fact that **in** is a locative, and not a directional, preposition.
such a phrase:

56a. Amy gave the doll to Beth.

[CAUSE ([AMY], [GO ([DOLL], poss | FROM ([AMY])]
 | poss | TO ([BETH]))
 | poss | --
 | path | --]

56b. *Amy gave the doll from Amy to Beth.

Likewise, receive contains in its semantic representation a TO phrase which never appears.

57. Beth received the doll.

[GO ([DOLL], [TO ([BETH]))]

The inability of a clause to co-occur with a given verb is seen as an argument that the meaning of that clause is incorporated into the meaning of that verb. An example like melted, however, differs from examples like give and receive. In give and receive, the nouns which appear in the implicit locative expression (the FROM or TO phrase) appear as actual syntactic constituents. The locative expressions semantically incorporated into a verb like melted, on the other hand, have no overt realization in the sentence. How is it that we determine their content?
Melted, for example, doesn't co-occur with a TO or a FROM phrase, therefore, we assume it has incorporated into it a source and goal. But, do the properties SOLID and LIQUID necessarily fill these roles? Perhaps melted is not synonymous with "went from solid to liquid." Maybe this second expression only overlaps with part of the meaning of melted. For example, melting implies a change in temperature. How do we know that the decomposition doesn't contain:

```
58.
  | FROM ([ LESS-TAN-MELTING-POINT]) |
  ... | temp |
  | TO ([ GREATER-TAN-MELTING-POINT]) |
    -- temp --
```

or even the exact melting point of the substance in question?

The discussion above might seem a bit exaggerated, but this is the logical consequence of a theory which allows the introduction of real world information for which there is no morphological evidence. Any theory of lexical decomposition needs to be constrained in some way. We must have some method of determining what information can and can't be included in a lexico-semantic representation.

We are making a distinction here between the semantic representation of a word which includes all the real world information, inferences and presuppositions which are associated with the meaning of a word; and the lexico-semantic representation of a word, reflects those aspects of meaning which languages draw
upon in creating labels for lexical items. We use languages in the plural sense here since not every language will have a one-to-one correspondence between lexico-semantic units and morphological units. And, therefore, it will take extensive cross-linguistic comparisons to determine the smallest universally relevant lexico-semantic units.

In examples like melt, English alone proves to be an inadequate testing ground for the determination of the semantic decomposition of such a verb. Too many possibilities are allowed. We need some universal set of constraints on possible representations which will help limit the set of possible choices in English. [11]

Let's consider another problem concerning not the content of FROM and TO phrases, but cases where it is questionable whether or not one should include a source or goal phrase. Again, we consider change of state verbs. The following two examples, according to Jackendoff, do not contain source phrases:

11. We use Jackendoff's work as a source of problematic examples not because we disagree with his approach, but rather because with proper constraints, his approach promises to be among the more fruitful analyses available. Although we would contend that using English alone, a thorough lexical analysis of English is impossible, Jackendoff provides one of the more plausible accounts because he is most cautious and conservative in his analysis.
59. The pages yellowed.

[GO ([PAGES], [TO ([YELLOW])])]
  ident ident property

60. The flames blackened the building.

[CAUSE ([FLAMES], [GO ([BUILDING],
  ident

  [TO ([BLACK)])]))
  ident property

Recall the previously discussed example, "The metal melted," and compare its representation to the two sentences given above. In the melted example, both a source and goal are included in the representation. Jackendoff argues that melt must include both a beginning (SOLID) and an end (LIQUID) state in order to distinguish it from a word like condense, which involves a gas, not a solid, becoming a liquid. He cites Dick Carter (personal communication, but see also Carter 1976:61) who points out that verbs like melt and condense, which require a source, are rare. For example, there are no verbs meaning "to change from yellow to red." On the basis of such evidence, Jackendoff omits source from the semantic decomposition of "the pages yellowed," where we might have assumed the following to be a plausible representation:

61. The pages yellowed.

[GO ([PAGES], [TO ([YELLOW])])]
  ident property

  -- ident property --

Then again, if a representation such as the one above were to be
excluded, we would expect the following sentence to be possible, but it obviously is not.

62. *The pages yellowed from white.*

We are not attempting to argue that a FROM phrase should be included in sentences containing "yellowed." In fact, Carter's observation is rather well taken. Rather, we are trying to demonstrate that on the basis of English evidence alone, certain issues seem unresolvable in any definitive way. Clearly, in semantically abstract examples which are not morphologically transparent, determining any locative template upon which the semantically extended example is founded becomes a very tricky enterprise. Arguments if existent are indirect and extremely subtle. Need this be the case or is it a consequence of the fact that arguments for the Locative Hypothesis (or Thematic Relations Hypothesis) are so frequently drawn from English--a language whose lexical semantics is opaque to say the least?

Although there is something appealing about complicated, indirect solutions based on subtle intuitions, if a straightforward argument exists, clearly it is to be preferred. Our approach toward solving the problems of lexical analysis is straightforward. We argue that by choosing the right set of languages as the object of analysis we can reduce the task of determining the locative basis of language and its extension to more abstract semantic fields to the trivial task of morphemic analysis. The "right
languages" are those languages which have a limited inventory of morphemes, consisting of motion and location morphemes and a set of classifiers indicating shape information. American Sign Language, we will argue, epitomizes such a language and supports the Locative Hypothesis in the strongest possible sense.

Even if ASL proves to have the "right stuff" in terms of morphological complexity and semantic constancy, it is still not a trivial matter to use the knowledge we gain about lexico-semantic primitives in ASL to inform an analysis of English, or any other language. We cannot, for example, look at the overt morphology of the sign for "give" in ASL and assume that because it is multi-morphemic and composed of lexico-semantic primitives, it reflects the covert sublexical structure of give in English. Lexico-semantic primitives, we will argue, are a set of building blocks which languages draw upon to construct word labels. The aspect of the meaning of a given concept which a word draws upon is to a certain extent arbitrary, as is the way such a partial concept is cast in locative terms. Remember the various options presented for talking about time where the role time takes in a given utterance can vary in terms of its thematic role. The following two sentences are roughly equivalent in meaning:

63. We are coming up on five o'clock.

```
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Theme</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Goal</td>
</tr>
</tbody>
</table>
```

64. Five o'clock is creeping up on us.

```
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Theme</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Goal</td>
</tr>
</tbody>
</table>
```

- 75 -
Both statements are locatively based, but in the first sentence we is cast as the moving element, or theme, and five o'clock is cast as the goal. These roles are reversed in the second sentence. The roles are changed, but the locative schema remains the same. We also find that crosslinguistically languages differ in the locative characterization they give to certain concepts. One language might say Thirst is at me. or I have thirst, where the expression is locational and thirst is the theme. Another might say Thirst overcomes me, where the expression is motional and thirst is the theme. We also find forms like Thirst is at me. vs. I am in a state of thirst., where thirst is theme in the former and location in the latter.

All we can do by examining ASL and languages like it is to narrow in on the set of lexico-semantic primitives and characterize ways in which they can be combined. If one chooses to extend what for us is a study of overt morphology to a study of lexical semantics, the arguments still need to be made for each particular language as to what the thematic representation of the word might be. Our study will only aid in narrowing down the possibilities to a set of natural lexical semantic representations—ones which utilize the kinds of semantic units languages tend to encode word internally. It will also attempt to show that only part of the sublexical structure, if any, has any relevance in the syntax.
CHAPTER 2

INTRODUCTION TO A LOCATIVE BASED NOTATIONAL SYSTEM

2.1 INTRODUCTION

American Sign Language is a language made in space. It expresses, in a particularly perspicuous manner, the way other grammatical systems are built upon this spatial base. The analysis which will be proposed in this thesis argues that all the lexical items in ASL are ultimately "built up from" an inventory of shape and object classifiers plus five basic relational morphemes, each of which has a locative or directional meaning. Rules of word formation combine these five basic motion/location morphemes and the set of classifiers in various ways to create the entire resources of the ASL lexicon. The lexicon of ASL also contains a number of frozen forms originally derived by rules of word formation, but no longer seen as productive combinations of simpler forms. These frozen forms, though no longer productive, have a morphological form and meaning which is partially predictable because we can recognize the word formation rules which were involved in their initial composition. This is essentially the conception of the lexicon delineated by Aronoff (1976) and
Jackendoff (1975). Further expansion of the ASL lexicon occurs by two means. The first is a recursive rule of Theme Incorporation which inserts a nominal element (a classifier, noun or nominalization) into a word stem. "Theme," as we noted earlier in Chapter 1, is a semantic notion. It marks that element that moves with respect to a verb of motion or whose location is asserted in a verb of location. The second expansion process is metaphorical extension in which the literal meaning associated with locative/directional words is extended, often by association with a body part, to more abstract domains, forming semantically extended classes in semantic fields such as emotion, perception or cognition.

Before the structural properties of the ASL lexicon can be systematically addressed, it is necessary to introduce some mechanism for notating signs. In this chapter, only a small set of signs will be compared and contrasted. Our goals are to provide familiarity with the notational system which will be used in this thesis and to offer a glimpse at some of the structurally interesting properties of ASL signs.

As a result of the lengthiness of prose descriptions of visual events, this chapter will seem rather lengthy. Such detailed verbal description is, however, necessary. Pictures will not suffice. ASL is highly agglutinative with a rather definitive temporal sequencing of its formative elements, but with one twist. Because of the two handed nature of ASL and the multiple sets of muscle groups which function as articulators (shoulder, elbow, wrist, fingers), several sequences of movements can be articulated.
simultaneously, one embedded within the other. Thus, the visual image of the sign itself, although it contains all the morphemes in their structured arrangement, poses a problem for visual analysis—especially for viewers unfamiliar with examining such complex motor acts in any linguistic manner. The notation we will propose strives to encode the formational properties of the sign, while also revealing its hierarchical structure and temporal sequencing. Furthermore, we will see that, much like sentences, signs can exhibit a certain degree of structural ambiguity which the proposed notation allows us to tease out.

This chapter will introduce a notation for ASL signs which is true to their formational and morphological realizations and which is narrow enough to capture the relevant structural properties of each sign. No notation can be theory neutral. This is no exception. This account rests upon some very basic assumptions which it might be helpful to state up front. At this point the hypotheses we are making will not be argued for. Evidence for these assumptions will be presented in later chapters. And, their main source of support will come from the insights and generalizations they allow us to capture about the grammar of ASL.

First, it is assumed that the entire lexicon, in fact most of ASL grammar, is locatively based. Thus, all signs, even those which have undergone diachronic processes of change and reanalysis can be encoded with a small set of basic formatives: motions, locations and shape classifiers. This assumption we will refer to as The Locative Hypothesis.
Second, we have the Linear Precedence Hypothesis which assumes that signs are morphologically complex and that sign internal morphemes are sequenced. As with any motor act, the articulation of the sign is temporally ordered. Such an assumption may seem uncontroversial, but an examination of much of the early literature in ASL linguistics assumes the opposite. Signs have been assumed by many to be monomorphemic and non-sequential, a factor which might be attributed to the fact that signs are realized in a visual modality in which images are most commonly seen as gestalts. Think of a painting. A painting is a static representation of a sequentially produced event—the process of painting. Those who view a painting have not followed the process, thus they see it as a gestalt. But signers are viewing the moment by moment production of the sign, a sequential event. Furthermore, the production of a sign also exhibits the transience we find in speech—a movement or handshake utilized at the beginning of a sign may be gone in the final stages of its articulation.

A third assumption made is that linear precedence is not obligatory. Two morphemes or strings can be marked as unordered with respect to one another; i.e., they can occur in any relation except a precedence relation. The prototypical realization of this relation in ASL is simultaneous articulation, but any degree of overlapping will suffice. For example, a repeated opening and closing of the hand is a temporally ordered motor act; and, the movement of one's hand from waist level in front of the body to contact with the ipsilateral shoulder is another temporally ordered motor act. These two gestures can be simultaneously articulated.
and still maintain their individual temporal properties; i.e., moving the hand from waist to shoulder while repeatedly opening and closing it. The parts of each independent gesture obey a set of linear precedence rules, but the two gestures are not ordered with respect to one another. Assuming the potential for such articulations will be termed The Simultaneity Hypothesis.

Fourth, it is possible for two elements to be ordered with respect to some third element, but have no ordering restriction with respect to one another. Consider the following two linear precedence statements: A precedes B, C precedes B. There is no statement concerning the relations of A and C. The ordering of A and C with respect to one another is not fixed. Thus, they may be simultaneous or they may be freely ordered. In this example linear precedence is not exhaustive. This will be termed The Partial Ordering Hypothesis.

Finally, although two strings may be unordered, it is still possible for a dominance relation to hold between them. For example, although two strings may be simultaneously realized, it is still possible for an asymmetric c-command relation to hold between them; i.e., one could have scope over the other. Let’s construct a manually articulated example. Let the left hand assume the shape of a fist with the thumb side of the hand oriented upward. Let the right hand assume a flat handshape with the palm oriented downward. Now let’s consider two locative relations, one involving movement and the other purely locational. First, we have a contact relation between the fist and the flat hand. The fist is at some location and the flat hand is on it (ON). This is string number one. Now
we have a second relation. The flat hand repeatedly moves from one position to another position (FROM-TO). This is string number two. These two strings can occur simultaneously, but there are two possible outputs. In both cases, the flat hand is in contact with the fist throughout the sign. In the first example (articulation 1), the configuration of hand and fist moves as a unit from one location to another location, let's say from near the body to about twelve inches in front of the body. In the second example (articulation 2), the flat hand remains in contact with the fist, but it moves repeatedly from the first knuckle of the thumb of this fist to the first knuckle of the index finger. In articulation 1, the "FROM-TO" relation has scope over the "on" relation. In articulation 2, the "ON" relation has scope over the "FROM-TO" relation. Thus, we have two strings which are simultaneously articulated, with two different dominance relations. The fist in these examples must linearly precede both strings; i.e., fist precedes ON, fist precedes FROM-TO). Dominance relations can hold even in the absence of any precedence restriction, thus the two can be seen to be independent. We will term this The Precedence/Dominance Independence Hypothesis.

The need for an independent characterization of precedence and dominance has been frequently cited (Higginbotham (1983), Pullum (1982), Gazdar, Klein, Pullum and Sag (in press). One of the most pressing motivations for such a distinction has been the existence of discontinuous constituents in what have been called "non-configurational" languages (e.g. Warlpiri, Japanese, Hungarian), languages where a formative or string dominated by one
node intervenes between two formatives dominated by a different
node (see Hale (1983), Zubizarreta and Vergnaud (1982). ASL
shares many similarities with these apparent non-configurational
languages and exhibits evidence of such discontinuous constituents,
but it offers an even more interesting piece of support for the
separation of precedence and dominance. As we mentioned above in
the discussion of The Partial Ordering Hypothesis and The
Simultaneity Hypothesis, when there is no ordering statement
between two formatives or when they are stipulated as unordered,
they can be realized simultaneously. Such a situation, although
uncommon in spoken languages, is predicted by the independence of
precedence and dominance. We can only assume its scarcity in
spoken languages is a constraint placed on these languages by their
production modality. The only spoken language situation comparable
to this involves articulatorily distinct lexical formatives like
tones (which phonetically cannot stand alone) vs. segments such as
consonants and vowels. In languages where a tone can serve as the
morphological marker of a relative clause, that tone is generally
realized concurrent with some portion of the clause which it marks.
As we will see, in ASL the potential for simultaneous realization
is not limited to phonetically necessary associations.

Before we actually turn to a discussion of the notational
system which will be used here, we need to consider previous
notational conventions and the problems they pose. [1] Below we
will look briefly at the most prevalent notational system currently
in use for transcribing ASL.
2.2 PROBLEMS WITH GLOSSING NOTATION

A glance at previous articles in ASL linguistics reveals a predominant use of "glossing" to notate ASL signs. "Glossing" involves the use of English words, written in upper case, to denote ASL signs. The English gloss is generally the most common translation or paraphrase associated with a given sign. Inflectional information such as subject and object agreement, source and goal agreement, aspectual marking and internal morphology are simply omitted. Consider the sign associated with the English meaning "already." The gloss for this sign is FINISH. FINISH is an ASL sign whose most common translation is "finish," but is also translated as "already" and in some cases as the past perfect marker "have." See the examples below:

1. POINT FINISH, LEAVE.
   3rd per. ------
   'He/she finished and left.'
   ------

1. The bulk of this thesis was completed prior to the development of a system of phonetic transcription for ASL which has been proposed by Liddell and Johnson (in preparation) -- see also Liddell (1983, 1984, in press). It will not be discussed here, except to point out that this system misses several generalizations needed to characterize ASL signs in the theory which will be proposed here. For example, it does not allow easily for the simultaneous realization of sequential strings, a property shared by every sign. Instead separate features of hand internal movements are proposed. If some variant of such a transcription system could be made compatible with this analysis, however, it would free us from the last vestiges of English glossing which still remain in our characterization of locative relations.

- 84 -
2. FINISH EAT POINT

----- 2nd per.

'Have you eaten?' [2]

-----

3. KNOW FINISH

-----

'I already know.'

-----

Glossing is an inadequate form of transcription and has time
and again lead to misanalyses which can be directly attributed to
analyzing the glosses as opposed to analyzing the signs themselves.
Glosses have little to do with the actual morphological or
formational properties of signs. They also tend to obscure
syntactic agreement processes. For example, the gloss for the ASL
sign meaning "give" is GIVE, for "move" is MOVE, and for "inform"
is INFORM; yet, these three signs are nearly homophenous in ASL.
[3] The only differences are that GIVE starts at chest level (most
frequently near the signer's body), INFORM [4] starts at the
signer's forehead and MOVE starts in neutral space at about waist
level. It differs from GIVE and INFORM in two ways: 1) the
orientation of the palm is downward rather than upward (an

2. The notation 'q___' above an ASL sentence
indicates the duration of a question facial expression.
This facial expression, and the inversion of the
pronoun are the primary markers of questions. A
detailed study of the role of facial expression in ASL
sentences and their notation appears in Baker-Shenk
(1983).

3. The word homophenous is not a misspelling. It
applies to words which are visually similar.

4. For ease of explication and purposes of
comparison, this discussion refers to the one handed
version of these signs. The two handed variants will
be addressed later.
indication of the hand used for support, as in carrying), and 2) the relation held at the beginning and endpoint of the sign's movement involves location at rather than orientation toward the source and goal (a common difference between signs with a literal vs. figurative motion/location interpretation). Nonetheless, the hand configuration and general pattern of movement for all three signs is the same. In essence, MOVE involves movement from one place to another (i.e. "move from place 1 to place 2"), GIVE is "MOVE from one person to another" (figurative extension from movement in space to transfer of possession) [5] and INFORM is "GIVE from the head" (figurative extension of GIVE to the cognition class).

Neither the similarities nor differences between these signs can be captured by the use of glosses. There have been numerous attempts to supplement glosses with additional information. Indices have been used to indicate subject and object agreement (e.g., iGIVEj). Symbols have been attached to signs to indicate various forms of morphological modulation such as aspectual reduplication (GIVE++)). But, these minimal innovations still leave the glossing system highly unsatisfactory.

2.3 PROSE DESCRIPTION OF A SINGLE SIGN: GIVE

Let's work through a prose description of the articulation of

5. This statement is a bit imprecise. Actually, GIVE is the extension of another sign identical to MOVE in all respects except for a change in orientation of the palm from downward orientation to upward orientation. This sign is glossed as CARRY-BY-HAND. We will come back to this sign later.
the sign for "give" in ASL. We will describe the form in which the
giver and the recipient are both third persons and where the giver
is attributed role prominence. Role prominence assigned to a given
person in an event means that the event is seen from the
perspective of that person. As a preliminary to description of the
actual sign, let's take two points in the signing space in front of
the signer's body and assign them the indices \( i \) and \( j \). These can
be any two points in a horizontal plane about midway between the
waist and chest. We'll let one be to the signer's right (\( i \)) and
the other to the signer's left (\( j \)). This assignment is arbitrary.
Thus far, no overt articulation has been made. Establishment of \( i \)
and \( j \) and their association with specific NPs would have been made
prior to the articulation of the verb, either within the sentence
or in the preceding discourse. Now let's turn to the actual
articulation of the sign.

First, the *signer's torso* shifts rightward slightly and is
positioned at *location \( i \)*. Then the right hand is *oriented palm
upward*. The *four fingers of this hand are adjacent to one another
forming a flat planar surface*. The *thumb is opposed to and brought
in contact with the inside surface of this four-fingered plane at
about the first knuckles of the middle and ring fingers*. The hand,
in this configuration, moves from its fingertip *orientation toward
the signer's chest* to fingertip *orientation toward location \( j \)* at
*chest level*. This movement begins with the fingertips *oriented
toward position \( i \)* and ends with the fingertips *oriented toward
position \( j \)*.
In the above passage we have underlined relevant actions and body parts which have morphological significance in ASL. The signer's torso is not merely part of the body to which the articulators (the arms) happen to be attached. It is a morpheme which marks role prominence. We refer to this morpheme as "SBP" (Signer's Body Pronoun/Position), following Kegl (1976a,b), or "the role prominence marker," following Kegl and Gee (1983). It marks the person from whose perspective the event is viewed. If, for example, the SBP were positioned at location j, it would indicate role prominence on the part of the recipient.

The phrase at location j includes the next three morphologically significant terms. The word "at" indicates the relation that the role prominence marker holds with respect to some location. We label this ASL morpheme as AT. [6] It is the unmarked base form, indicating a purely locative relation which is neutral in terms of specifying contact (ON) or containment (IN), yet still indicating proximity. AT is a member of the set of ASL morphemes called "terminators." These morphemes mark the relation held at some terminus point (beginning or endpoint) of a movement. The set of terminators includes AT, ON, IN and WARD (orientation toward). In non-movement words, the terminator is the central relational morpheme and the focus is on the the end result or final state reached by a movement. The movement morpheme itself

6. We chose the upper case notation both for consistency with the gloss format and in recognition of the fact that we still have the drawback of a English based gloss for an ASL morpheme. We will also argue AT to be a lexical primitive. In this sense, the upper case notation calls to mind the use of upper case to indicate semantic primitives.
(movement to (TO) or away from (FROM)) has been reduced. Terminators mark the focal point of a movement or an act of locating. The term location marks the location at which the relation of "being at" holds for SBP (the signer's body pronoun). The label we give to this morpheme is LOC (the locative argument marker). The index, $i$, is a separate morpheme which sets the LOC equal to some specific position in the signing space. An infinite number of indices ($i,j,k,...n$) are possible in ASL.

The five morphemes mentioned above combine to form a single word in ASL. This word is a pronominal clitic which is co-indexed with the NP assigned role prominence. It is invariably singular and is most frequently associated with grammatical subjects or ethical datives. We will not argue in detail here for the labelling of this word as a clitic except to note that it is unstressed and must attach to the beginning of a stressed lexical item to be realized. (It also conditions pro-drop.) A detailed discussion of clitics appears in Chapter 6. The notation we use for this role prominence clitic appears below:

\[
\text{\texttt{AT LOC}}
\]

\[
\text{\texttt{SBP i}}
\]

\[
\text{\texttt{'person with role prominence at location'}}
\]

\[
\text{\texttt{i}}
\]

A schematic labelling of the parts of a word appears below. Notice that the movement base is missing in the locative word above. Pure locatives are assumed to be related to their movement counterparts.
They focus upon the relation held at the end of the sign. They are notated in the same way as their movement counterparts, except for the reduction of the movement morpheme: LOCi AT FROM and TO AT LOCi. [7] We will use the slashes, here, only for purposes of clarification. Whether a locative sign focuses on the end result of a FROM movement or a TO movement can be determined by the relative ordering of the LOC and the terminator: LOC TERM vs. TERM LOC. An initial LOC indicates source as the relevant location, indicating a FROM-type word, and a final LOC indicates goal as the relevant location, indicating a TO-type word.

5. WORD SCHEMA:

\[ \text{M} + \text{T} \rightarrow \text{LOC} \]

\[ \text{TH} \]

\[ \text{M} = \text{movement base} \]
\[ \text{T} = \text{terminator} \]
\[ \text{LOC} = \text{locative argument marker} \]
\[ i = \text{index} \]
\[ \text{TH} = \text{theme} \]

7. Reduction of the movement morpheme will be indicated with slashes through the reduced morpheme. Since this reduction is predictable in purely locative signs, the notation can be simplified such that locative forms using a reduced movement will simply omit this movement: (TO\(+\)AT LOCi = AT LOCi; LOCi AT\(+\)FROM = LOCi AT; etc.). It is important to note that the movement is still relevant in these signs since "LOCi AT" represents the final state achieved in LOCi AT\(+\)FROM, the state of being separated; whereas AT LOCi represents the final state achieved in TO\(+\)AT LOCi, the state of being in proximity. If the movement were irrelevant, LOCi AT and AT LOCi should look identical; one representing the relation held at a source (proximity), and the other the relation held at a goal (also proximity).

8. The mirror image ordering is also possible, i.e., LOC T + M.
Now let's return to a discussion of the sign to which the role prominence clitic is attached; i.e., the ASL equivalent of "give." This sign is a bit more complex than the role prominence clitic. Roughly, this sign involves movement from orientation toward location i to orientation toward location j. As in the clitic example, locations i and j are represented by the combination of a locative argument marker (LOC) and an index (i or j). The path of movement corresponds to two movement morphemes: FROM and TO. The argument that this path involves two distinct movement components requires evidence from number agreement and from a rule of source deletion which optionally deletes the FROM morpheme and its LOC. We will present these arguments later. The terminators associated with FROM and TO are both the orientation terminator, WARD, which specifies orientation toward the relevant location. This terminator often appears in signs which are metaphorically extended from literal motion/location forms. Thus, we have the following partial representation of the sign:

6. PARTIAL REPRESENTATION OF GIVE:

\[ \text{LOC} \rightarrow \text{WARD+FROM+TO+WARD LOC} \]

\[ i \rightarrow \ldots \rightarrow j \]

'to go from orientation away from one position to orientation toward another position'

LOCs can be modified to include various types of information: directions like up, down, right, left, etc.; body parts: forehead, eye, chest, etc.. In the case of this example, the information that the movement occurs at chest height is encoded by
associating the two LOCs with the body part, chest, as follows:

7. PARTIAL REPRESENTATION OF GIVE (with body part association):

\[
\text{LOC \ WARD\ FROM\ TO\ WARD LOC} \\
| i \quad \quad \quad \quad \quad | j \\
\text{chest} \quad \quad \quad \quad \quad \text{chest}
\]

'to go from orientation toward the chest at location i to orientation toward the chest at location j'

Now let's consider the representation of the hand that moves from orientation toward location i to orientation toward location j. The hand with thumb and fingers contacting is a special kind of classifier in ASL, a handling classifier.

There are two types of classifiers: shape/object classifiers and handling classifiers. Shape/object classifiers use handshape to indicate the shape or some abstract property of an object: g-classifier (index finger) = long thin object, c-classifier (cupped hand) = rimmed object, s-classifier (fist) = round solid object, b-classifier (flat hand) = flat surface, thumb-classifier (thumb) = object taller than wide, etc. (see Kegl (1976a, b), Supalla (1984)). Handling classifiers, on the other hand, classify various means of handling objects: grasping, clamping, pinching, hooking, etc.. These classifiers are morphologically complex, encoding a contacting relation (ON) with some location by means of some configuration of the thumb and fingers.
8. PARTIAL REPRESENTATION OF HANDLING CLASSIFIER:

ON LOC

...'

contact with some location'

In the GIVE example, two classifiers are involved. The configuration of the fingers (four fingers adjacent to one another forming a planar surface) constitutes a b-classifier for "flat surface." The second classifier is represented by the thumb. It indicates an object taller than it is wide. Of course, since the object classified in this example is a hand, the articulators forming the classifiers are, in essence, representing themselves (fingers and thumb).

The thumb-classifier does not always represent itself. In fact, in one-handed non handling classifiers the thumb serves as a copy classifier. It represents a copy of whatever classifier it is opposed to. Often, one handed signs with copy classifiers have two handed variants. When two hands are available, the copy classifier is no longer necessary. The two hands articulate duplicate versions of the intended classifier. Below we will discuss the representation for the reciprocal relation between the thumb and four-fingered plane of the handling classifier in GIVE, but discussion of one other example before we continue will allow us to give and example of the copying function of the thumb-classifier while also setting the stage for our analysis of the one-handed opposition of the two classifiers involved in the handling classifier.
There is a two handed sign in ASL, frequently glossed as JAW-DROP, which means "to be shocked or surprised--i.e., agape." In this sign the body is located at a particular position. The left hand, in a curved h-handshape (index and middle finger extended and curved to form a hooked handshape), is positioned near the mouth with the palm facing outward, away from the face. The right hand, in the same handshape, moves downward away from contact with the left hand. The curved h-classifier represents a narrow curved object (in this case, the jaw). [9] The representation for this sign appears below:

9. JAW-DROP (2 handed):

\[
\begin{array}{cccc}
\text{AT LOC} & \# \text{LOC} & \# \text{LOC. ON+FROM} \\
\triangle & 1 & 1 \\
\text{SBP} & \text{mouth curved h-CL} & \text{TO+AT LOC} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{curved h-CL down} \\
\text{role} & \text{ground clitic/} & \text{core sign} \\
\text{prominence} & \text{classifier clitic} \\
\text{clitic} \\
\end{array}
\]

The first part of this sign is the already familiar role prominence clitic. The second part of the sign is a second type of clitic we will refer to as a classifier clitic or ground clitic. The theme

9. Four degrees of width are representable. The g-classifier (index finger) indicates thin objects. The h-handshape (index and middle finger adjacent) represents narrow objects. The b-classifier represents wide objects. The i-classifier (pinky) represents very thin objects. The h-classifier and b-classifier can have their fingers spread, in which case we get the v-classifier, "two separated parallel straight objects," and the 4-classifier, "4 separated parallel thin objects." All of these handshapes can also be curved. Curved-b equals the o-classifier and curved-4 classifier is more commonly known as the claw handshape.
of such a clitic is a classifier rather than the signer's body. The clitic as a whole serves as a ground (in the sense of figure (theme) and ground (source or goal)) for the movement of the sign. In this example, the classifier clitic is positioned at the source of the movement, LOCi ON+FROM. It is oriented away from the face (LOCi WARD+FROM). Finally, the core of the sign indicated movement away from the mouth (LOCi ON+FROM) in a downward direction (TO+AT LOC-down) by a curved narrow object (curved h-classifier).

Now consider the one handed version of this sign. Obviously, the one hand cannot realize two curved h-classifiers. So, the thumb-classifier (copy classifier) is used. Also, instead of one hand moving away and downward from the other non-moving hand, the two classifiers reciprocally move away from each other. Simultaneously, the thumb serves as a ground clitic and the curved h-classifier as theme, and the curved h-classifier serves as ground clitic and the thumb-classifier as theme. The following is a representation of the one-handed version of JAW-DROP with the locative relationships held by each of the classifiers specified separately. Simultaneous articulations on the same hand are represented one above the other.
10. JAW-DROP (one handed, expanded notation):

\[\text{AT LOC} \# \text{ LOC WARD} \# \text{ LOC ON+FROM}\]
\[
\begin{array}{c}
\text{SBP} \\
i \\
mouth \text{ curved h-CL}
\end{array}
\]
\[
\begin{array}{c}
\text{LOC WARD} \\
i \\
mouth \text{ thumb-CL}
\end{array}
\]
\[
\begin{array}{c}
\text{TO+AT LOC} \\
\text{thumb-CL} \\
down
\end{array}
\]
\[
\begin{array}{c}
\text{LOC ON+FROM} \\
i \\
curved h-CL \\
up
\end{array}
\]

The notation we will use collapses the two representations by means of slashes and marks the constituent as [reciprocal]. See below:

11. JAW-DROP (one handed, collapsed notation):

\[\text{AT LOC} \# \text{ LOC WARD} \# \text{ LOC ON+FROM}\]
\[
\begin{array}{c}
\text{SBP} \\
i \\
mouth \text{ curved h-CL/} \\
\text{thumb-CL}
\end{array}
\]
\[
\begin{array}{c}
\text{LOC WARD} \\
i \\
mouth \text{ thumb-CL/}
\end{array}
\]
\[
\begin{array}{c}
\text{TO+AT LOC} \\
\text{thumb-CL/} \\
down/up \\
curved h-CL
\end{array}
\]

There is a difference in the behavior of the classifier clitics in the two-handed versus one-handed versions of these signs. If possible, the classifier clitic is articulated and then perseverated throughout the articulation of the sign to which it is cliticized. This happens in the two-handed sign because one hand articulates the classifier clitic and the other articulates the following sign. However, in the one-handed reciprocal sign, both parts of the hand (thumb and fingers) first articulate the classifier clitics, and then both parts also articulate the movement of the following sign. As a result, the classifier clitics cannot perseverate. Thus, this part of the sign is
transient. It is only our knowledge of the non-reciprocal form of
this sign that informs our analysis of the classifier clitic in the
reciprocal form.

We can now return to our discussion of the handling classifier
of GIVE which involves opposition of the thumb and the
b-classifier. Remember, in the handling classifier that the thumb
classifies itself and doesn't function as a copy classifier.
Except for this difference, the reciprocal in JAW-DROP and the
reciprocal in GIVE are very similar.

In the handling classifier of GIVE, the size of the object
handled is expressed by the locative relation between the
b-classifier and the thumb-classifier. Three degrees of width can
be expressed: normal, thick and wide. [10] By normal, we mean a
size which allows the two parts of the hand to come into contact.
The normal width can reflect handling a flat object like a piece of
paper, money, etc. or it can be interpreted as a handling relation
which is unspecified for the size and shape of the object being
handled. The relation between the b-classifier and the
thumb-classifier can be represented as follows:

10. Only three morphologically relevant degrees
of width are possible. This follows from the set of
possible locative relations available for constructing
these classifiers: ON LOC (contact; handle a flat
object), AT LOC (proximity; handle a thick object),
LOC AT (separation; handle a wide object).
12. RECIPROCAL CONTACTING RELATION (normal size):

\[ \text{AT LOC} \# \text{ON LOC} \] [reciprocal]
\[ \text{b-CL/thumb-CL} \quad \text{a} \quad \text{thumb-CL/b-CL} \]

'fingers and thumb contact each other'

In such a relation, the two classifiers simultaneously serve as a theme and LOC with respect to one another; namely, the b-classifier contacts the thumb and the thumb contacts the b-classifier.

Handling a slightly larger object (thick) is reflected by a proximity relation (AT), but not contact (not ON) between the two classifiers as follows:

13. RECIPROCAL PROXIMITY RELATION (thick size):

\[ \text{AT LOC} \# \text{AT LOC} \] [reciprocal]
\[ \text{b-CL/thumb-CL} \quad \text{a} \quad \text{thumb-CL/b-CL} \]

'fingers and thumb are near each other'

In such an example, the fingers and thumb are parallel.

Finally, handling a wide object is reflected by separation of the two classifiers. Since the two classifiers are articulated on the same hand, an upper bound is placed on this separation. The proximity relation (AT LOC) is expressed as focus on the final state of a movement TO a position near the LOC (TO+AT LOC) where the movement is subsequently reduced (TO+AT LOC). The two parts of the hand are in the state of contacting one another. The
separation relation is the flip of this situation, the result of mutual "from"-ing. It involves a focus on the final state of a movement away from some location (i.e., LOC AT+FROM), where the movement is reduced. Thus, LOC AT is the relation of being "apart." The reciprocal relation which signifies the handling of wide objects appears below:

14. RECIPROCAL SEPARATION RELATION (wide size):

\[
\begin{array}{c}
\text{AT LOC} \quad \text{LOC AT} \\
\text{a} \quad [\text{reciprocal}] \\
b-CL/thumb-CL \quad \text{thumb-CL/b-CL}
\end{array}
\]

'handling a wide object'

The entire handling classifier, then, is this reciprocal relation, specifying the relation between the thumb and fingers, embedded within a contacting relation, specifying contact with the object being handled:

15. HANDLING CLASSIFIER:

\[
\begin{array}{c}
\text{ON LOC} \\
\text{AT LOC} \quad \text{ON LOC} \\
\text{a} \quad \text{a} \\
b-CL/thumb-CL \quad \text{thumb-CL/b-CL}
\end{array}
\]

'handling a flat object or object unspecified for size or shape'

Finally, we come to the last piece of our prose description of the sign GIVE which concerns the orientation of the hand: the right hand is oriented palm upward. Upward palm orientation of the
handling classifier indicates that the hand is used for support rather than simply for manipulation. The orientation relation is represented as follows:

16. INDICATION OF UPWARD ORIENTATION:
---------------------------------------------

WARD LOC
    
    up

'... is oriented upward'

Now, let's put the pieces together. To indicate upward orientation of the handling classifier, this classifier is embedded [11] under an orientation relation (WARD):

17. ABSTRACT HANDLING CLASSIFIER (upward orientation):
--------------------------------------------------------

WARD LOC
    
    up

ON LOC
    a

AT LOC # ON LOC a [reciprocal]

b-CL/thumb-CL thumb-CL/b-CL

'carrying some object'

The handling classifier functions as a complex theme embedded within the matrix motion component (LOC1 WARD+FROM#TO+WARD LOCj) of the GIVE verb. The full representation of GIVE, including its role

11. Exactly what is meant by "embedding" will be elaborated upon later in the section on linear and non-linear arrangement.
prominence clitic, appears below:

18. GIVE (full representation):

---

\[
\begin{align*}
\text{AT LOC } & \quad \text{AT LOC } & \quad \text{LOC WARD+FROM+TO+WARD LOC } \\
\quad i & \quad \quad a & \quad \quad \text{chest} \\
\quad \text{SBP} & \quad \text{b-CL/thumb-CL} & \quad \text{WARD LOC} \\
\quad \quad \text{ON LOC} & \quad \quad \text{up} \\
\quad \quad \text{ON LOC [reciprocal]} & \quad \quad \text{b-class./thumb-class.} \\
\quad \quad \quad \quad \text{b-class./thumb-class.}
\end{align*}
\]

---

role = classifier → verb

a person flat hand is 1) orientation toward the chest
with role located at at location i changes to orientation
prom. is location i; toward the chest at location j;
assoc. with thumb is at 2) the handling classifier is
location i location i oriented upward; 3) it involves
contact with some object; 4) contact is made by a configuration of the
hand such that two hand parts contact one another; 5) the two parts are
the thumb and the fingers [12]

Notice in the above representation that the classifier clitic for
the handling classifier appears before the matrix movement. This
is a surface phenomenon. At PF, clitics must be word initial.

Even if a clitic is embedded within some movement, it moves to word
initial position. The indexing relationship still indicates that
the clitic is interpreted at its initial position. Furthermore,
the clitic from the embedded string cannot be co-indexed with any

12. The numbers 1-5, in this example, correspond
to levels of embedding where 1) is the matrix relation,
2) is the material under the first triangle, 3) the
material under the next triangle, and so on.
NP arguments in the matrix sentence. This prohibition against co-indexing is characteristic of embedded strings which are opaque domains in terms of indexing relations. Co-indexing can only occur string internally. Notice that the role prominence clitic and the classifier clitic are both clitics and as such they share this ordering relation with respect to the sign. However, they are not ordered with respect to one another. Therefore, they can be realized simultaneously or be freely ordered with respect to one another. This is an instance of partial ordering.

It is important to remember that, unlike glosses, the representation above for GIVE reflects both its formational and morphological makeup. This information is observable in the sign stream. Such a notation is necessary. It allows us to compare and contrast signs with one another rather than analyzing them on the basis of some arbitrary, English-based glossing system. It also forces us to make rather detailed decisions concerning the hierarchical structure of the sign; decisions which may be altered with the introduction of new evidence. The notation proposed here, although based on observable properties of the sign, is not theory independent. The choice of relevant units and their configuration follows directly from adoption of the locative hypothesis in conjunction with the structural analysis of ASL to be proposed here. This work represents the initial stages of fleshing out the framework being proposed. There are questions concerning configurational properties of the sign and the details of precedence and dominance relations which are still open or which additional evidence might well lead us to challenge. This is
advantageous. The fine tuned nature of the representation proposed allows us to make as well as refute such arguments. Previous glossing notations serve as mnemonics, not as tools for analysis. The exact analysis proposed here for GIVE differs from the analysis proposed in Gee and Kegl (1982a, b). This analysis will probably be refined or altered as research in this area progresses. Such is the nature of theory-based research.

2.4 COMPARISON AND CONTRAST OF MORPHOLOGICALLY RELATED SIGNS

To illustrate what a formationally and morphologically based system has to offer, let's take another look at the sign GIVE along with several formationally and morphologically related signs [13]: MOVE, CARRY-BY-HAND, HAND-OVER, GIVE, GIVE-OUT AND INFORM. The choice of signs and their ordering reflects a continuum of relatedness. A close inspection of these representations reveals the morphological similarities shared by these signs. They are all related to the basic motion/location signs MOVE and CARRY-BY-HAND. The two literal signs differ only in the orientation of the hand. The remaining signs are figurative extensions of these basic signs. Each sign presented below is fully transcribed in the proposed notational system. Subsequently, these representations will be compared and contrasted, noting characteristics such as body part association, hand orientation, choice of terminator, choice of handling classifier, and so on.

13. We will put aside for the moment whether every element which receives an English gloss actually has independent word status in ASL.
19. MOVE:

\[
\begin{array}{c}
\text{AT LOC} \ # \text{AT LOC} \ # \text{LOC AT+FROM TO+AT LOC} \\
\text{SBP} \ b-\text{CL/thumb-CL} \quad i \quad j \\
\text{WARD LOC} \\
\text{ON LOC} \\
\text{ON LOC [reciprocal]} \\
\text{thumb-CL/b-CL}
\end{array}
\]

20. CARRY-BY-HAND:

\[
\begin{array}{c}
\text{AT LOC} \ # \text{AT LOC} \ # \text{LOC AT+FROM TO+AT LOC} \\
\text{SBP} \ b-\text{CL/thumb-CL} \quad i \quad j \\
\text{WARD LOC} \\
\text{ON LOC} \\
\text{ON LOC [reciprocal]} \\
\text{thumb-CL/b-CL}
\end{array}
\]

21. HAND-OVER:

\[
\begin{array}{c}
\text{AT LOC} \ # \text{AT LOC} \ # \text{LOC AT+FROM TO+WARD LOC} \\
\text{SBP} \ b-\text{CL/thumb-CL} \quad i \quad j \\
\text{WARD LOC} \\
\text{ON LOC} \\
\text{ON LOC [reciprocal]} \\
\text{thumb-CL/b-CL}
\end{array}
\]
2.4.1 MOVE vs. CARRY-BY-HAND

The two signs MOVE and CARRY-BY-HAND share the following characteristics: the theme is the classifier for handling a thin object or handling an object unspecified for size or shape; 2) the LOCs need not be associated with body parts, indicating locative rather than source/goal agreement; and 3) the role prominence clitic can be co-indexed with a LOC other than one associated with the source or goal, a consequence of locative rather than person agreement. They share with GIVE their choice of handling classifier, but differ in the other two respects. In GIVE, the LOCs are associated with the body part chest, indicating person agreement as opposed to literal agreement with source and goal locations. The role prominence marker can be left neutral (unindexed), thus indicating narrator's perspective; however, if it is indexed, it must share the same index as either the source or goal, not some other NP in the sentence or discourse.

MOVE and CARRY-BY-HAND are literal motion/location signs. They differ from one another only in the orientation of the handling classifier. In MOVE, the handling classifier is oriented downward, indicating contact with but not necessarily support of the moving object by the hand. A simple shift to upward orientation yields CARRY-BY-HAND and indicates support of the moving object by the hand. Syntactically, these two motion/location signs have identical behavior.
2.4.2 GIVE vs. CARRY-BY-HAND

GIVE and CARRY-BY-HAND share upward orientation of the handling classifier. They differ in body part association and choice of terminator (AT vs. WARD). Use of the terminator WARD and association with body parts signals figurative extension of a literal motion/location form to an extended class. In this instance, CARRY-BY-HAND is extended to the abstract possession class sign which is glossed as "GIVE." The association of the source and goal LOCs with the body part chest restrict this sign to agreement with persons; namely, the agent and the recipient. [14] In this extended form, it is possession and not the actual object which is transferred. Thus, nothing need literally move from one location to another. Even if the transferred object does literally move, its initial and final position are not registered by the verb. The association of the movement with orientation terminators serves to downplay association of the movement with actual locations. In GIVE, even the handling classifier has a figurative interpretation. The transference of possession need not involve handling in any literal sense. Handling, in metaphorically extended forms, functions as a marker of agency. The presence of a handling classifier in the morphological theme position in the sign registers the presence in the sentence or discourse of some external argument which is to be taken as an agent. The exact details of this agency/causeative marker will be addressed in Chapter 5.

2.4.3 CARRY-BY-HAND Vs. HAND-OVER Vs. GIVE

The sign HAND-OVER is truly midway between CARRY-BY-HAND and GIVE. One LOC (the source) is associated with a location and the other (the goal) with a person. This sign can be interpreted as literal movement in space with or without entailing a notion of transference of possession. The optional metaphorical reading is a consequence of the association of the goal with the body part chest which generally signals person agreement. HAND-OVER shares with its more literal counterparts the fact that the role prominence marker need not be co-indexed with the source or goal. This is because the source LOC is a location unassociated with any body part which would lead us to assume person marking. The interaction between the role prominence marker and the locative argument markers plays a crucial role in the grammar which we will get into in a later chapter. Basically, the role prominence clitic is one of two case markers, while the locative argument markers and the theme position are thematic role markers for roles such as source, goal and theme.

Now let's turn to the set of figuratively extended forms: GIVE, GIVE-OUT and INFORM. We will begin with an examination of the one handed forms of each of these signs. Then we will return to consider the two handed forms. All of the signs discussed thus far can be one or two handed, but INFORM and GIVE-OUT more frequently occur in their two handed form. As we will discover, the two handed variant of INFORM complicates our story a bit and reveals additional insight into the structure of this sign.
2.4.4 GIVE vs. GIVE-OUT

We have already seen how GIVE is an extension of CARRY-BY-HAND to the possession class. INFORM is an extension of GIVE to the cognition class. Actually, the form of GIVE which extends to INFORM is GIVE-OUT, the imperfective form of GIVE. [15] Inspection of the representation for GIVE-OUT reveals that the only difference between these two forms can be found within the handling classifier. Instead of a clamped hand (the four-fingered plane and thumb in contact), the hand in GIVE-OUT involves the opening of a clamped hand (the four-fingered plane and the thumb start in contact and then move apart). Below are the two handling classifiers. The representation in (a) is the clamped hand classifier in GIVE. The representation in (b) is the opening hand classifier of GIVE-OUT.

25a. Clamped Hand Classifier of GIVE:

\[
\begin{align*}
\text{AT LOC} & \quad \# \quad \text{WARD LOC} \\
\text{b-CL/thumb-CL} & \quad \text{ON LOC} \uparrow \quad \text{ON LOC} \left[\text{reciprocal}\right] \quad a \\
\text{thumb-CL/b-CL} &
\end{align*}
\]

15. When GIVE is signed, it is generally assumed that what is given reaches its goal. GIVE-OUT indicates that the act of "giving" occurred, but it is not necessarily the case that what is "given out" reached its goal.

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25b. Opening Hand Classifier of GIVE-OUT:

\[
\begin{align*}
\text{AT LOC } & \quad a \quad \text{WARD LOC} \quad \uparrow \\
\text{b-CL/thumb-CL} & \quad \text{ON LOC} \quad \text{LOC ON FROM} \quad [\text{reciprocal}] \quad \text{=====
}
\text{thumb-CL/b-CL}
\end{align*}
\]

The arrows indicate the crucial points of difference between the two signs. Example (a) indicates that the two classifiers (thumb and four-fingered plane) are in contact; i.e., ON LOC, which is focus on the final relation held in TO+ON LOC. In example (b), the two classifiers begin in the same configuration but then move apart. This movement occurs simultaneously with the matrix movement from one location to another in GIVE-OUT (LOC1 WARD+FROM#TO+WARD LOCj). The fingers and thumb are together at LOCi and apart at LOCj. The ability of one movement to be realized during the articulation of another movement is a property which can be attributed to the degrees of freedom allowed when the arms and hands are the articulators. [16]

16. In several analyses, movements realized concurrent with other movements have been termed "hand internal movements." In many descriptions they have been listed as a class of gestures with its own unique features. Hand internal movements are often listed as features themselves: wiggling, closing, opening, etc.. This differential labelling obscures the similarity between hand internal movements and matrix movements. This analysis proposes that these movements have the same properties as the matrix movements. As we will see, they involve the same set of relations (TO, FROM, IN, ON, AT and WARD) and LOCs, and the same constraints on their combination. The only difference is that these sequences of movements and locations can be simultaneously realized.
There is a second minor detail concerning the articulation of GIVE-OUT which should be mentioned. The opening of the hand involves not only a separation of the thumb and the four-fingered plane, but the fingers of the four-fingered plane also spread apart as the two classifiers separate. This separation of the fingers might be in the process of being reanalyzed as a morphological marker of imperfective aspect, but I suggest that this spreading also has a physiological basis (i.e., might be a low level phonetic process). Ease of articulation seems to favor a spreading of the fingers in conjunction with a separation of the thumb and fingers. Without a lengthy physiological account which I am currently not ready to present, I suggest a simple self experiment. Compare the ease of opening the hand (in a palm upward orientation) with the fingers spreading and not spreading. When opening the hand without spreading the fingers, one has the feeling of having to resist this spreading. [17] Whether the notation should reflect the spreading of the fingers is open to question. In the present account, this detail will be ignored.

2.4.5 INFORM Vs. GIVE-OUT

Now let's turn our attention back to INFORM. This sign differs only minimally from GIVE-OUT. In INFORM, LOCl (the source

17. Preliminary studies of physiological constraints on sign articulation appear in Mandel (1979, 1981). I will point out several additional instances of such physiologically based phonetic processes in ASL as they arise. Not much work has been done in this area as yet, but close inspection of morphological paradigms in ASL reveals many variant forms whose systematic variation appears to have a physiological basis.
LOC) is associated with the forehead rather than the chest. This slight modification marks this sign as a member of the cognition class (signs associated with thought). There exist many classes of signs beyond those which refer to literal motion and location, but these words all extend metaphorically from the same class of literal motion/location signs; or secondarily, from signs which are themselves metaphorical extensions. Metaphorical extension generally involves association with some body part which marks the sign as a member of a particular semantic field (i.e., head=cognition, eyes=vision, chest=emotion, mouth=location, ears=audition, etc.). A second means of extension is compounding a sign, literal or already extended, with some extensional marker (a prototypical word associated with some extended class—THINK, KNOW (cognition), SEE (vision)): THINK+TOUCH [continually] = "perseverate", KNOW+DISAPPEAR = "forget", SEE+PAST = "reminisce". As with any compounds, these signs involve a certain amount of assimilation which does not occur when they appear together in phrases (see Klima and Bellugi (1979) and Frishberg (1975)).

2.5 A CLOSER LOOK AT INFORM: EVIDENCE OF COMPOUNDING

If we take a closer look at INFORM, we find that the two means of extension mentioned above might very well be one process at different stages of its historical development. Remember, we said above that INFORM is "GIVE-OUT associated with the head." Actually, when we look at all the morphological forms of this sign, particularly the two handed form and various reciprocal forms, it becomes clear that this sign is actually a compound of the sign
KNOW and the already familiar sign GIVE-OUT: KNOW+GIVE-ω₁ = INFORM. Again, it should be noted that the glosses give us no evidence of this whatsoever.

2.5.1 An Extensional Marker For The Cognition Class: KNOW

Before getting into the arguments for INFORM as a compound, let's take a look at KNOW, the sign purported to be the first member of this compound. As was noted earlier, KNOW frequently compounds with other signs to form cognition class signs (KNOW+DISAPPEAR = FORGET, KNOW+GRASP = MEMORIZE); although the most frequent extensional class marker for cognition is THINK, a sign identical to KNOW in all respects except that a g-classifier (index finger) for long thin object replaces the b-classifier of KNOW (THINK+CLASP HANDS = BELIEVE, THINK+PUT-DOWN-A-STRING = DECIDE). The sign for KNOW appears below:

26. KNOW

\[\begin{array}{c}
\text{AT LOC} \\
\text{SBP} \\
\text{ward LOC} \\
\text{TO+AT LOC} \\
\text{b-classifier forehead} \\
\text{clitic} \\
\end{array}\]

In the sign KNOW, the flat hand (b-classifier) is oriented toward and moves to the forehead position of the signer's body (i.e., of the role prominence clitic).
The sign KNOW is a body anchored word. Since this property of KNOW will prove essential to our analysis of INFORM, we will consider it in some detail. Body anchored words require association with the role prominence clitic. The LOC of the role prominence clitic and the LOC of the sign itself will always be co-indexed. This is inviolable.

There are apparent counterexamples to this body-anchor restriction where the sign KNOW appears to be located at a position away from the signer's body. These examples prove to be contractions of a pronoun (a pointing of the index finger toward the location associated with the referent) plus KNOW. When KNOW and a pronoun are contracted, KNOW is articulated in the position associated with the pronoun. It also seems to take on the characteristic deictic movement of this pronoun prior to the realization of its own movement. The hand moves to the pronoun location (TO+AT LOCj) and then orients toward the signer (WARD LOCi) while moving slightly forward (usually by means of a bending if the wrist) such that the endpoint of the movement indicates a trajectory toward the signer's forehead. There is no longer a full movement to the forehead location of the role prominence clitic. When a string such as TO+AT LOC is embedded under a non-motional orientation string (WARD LOC), pure orientation without movement has scope over the movement string. This movement string must be realized at the location of the non-motional string which dominates it, and thus the hand cannot move into actual proximity with the forehead. When the pronoun is initial in the contraction (as in the case of a subject pronoun), it subsequently deletes. This
position does not receive stress and pronouns which are unstressed regularly delete. If the pronoun were an object pronoun, it would follow KNOW. Since ASL has word final stress, this pronoun would receive the stress and would not delete. [18]

Three examples will be presented below. The first is the sign for a pronoun associated with location j, where j is some arbitrary location. The following two examples illustrate the output of the processes of object and subject pronoun contraction with KNOW.

The pronoun below is not marked for gender. Nor does it exhibit any inherent person marking; i.e., first, second or third person. If it is co-indexed with the addressee, it will be interpreted as a second person pronoun. If co-indexed with the role prominence marker, it will be seen as a first person pronoun. And, if co-indexed with some other position, it is a third person pronoun. The form chosen below indicates singular number agreement.

27. PRONOUN :

\[
\begin{align*}
\text{TO+AT LOC} & \\
\downarrow & \\
\text{WARD LOC} & \\
\downarrow & \\
g\text{-classifier } [19]
\end{align*}
\]

'\text{the index finger points to location j}'

18. For a detailed discussion of contraction and compounding in ASL see Kegl and Philip (in preparation).

19. The g-classifier is the index finger. It represents long thin objects, in this case the finger itself.
The next example illustrates contraction of the verb with a following object pronoun. The contraction of the two forms results in anchoring the non-motional orientation component, WARD LOCi, to the location established by the pronoun (LOCj). WARD itself is not specified for the location at which the orienting occurs, only for the location which the orienting is directed at. Thus, the actual positioning of the hand in WARD can be determined by the pronoun location. The shift in the position at which KNOW is articulated is the only salient distinction between the contracted and the non-contracted form in contraction with an object pronoun. Because this pronoun is stressed, there is no deletion.

28. OBJECT PRONOUN CONTRACTION WITH KNOW:

\[
\begin{align*}
\text{AT LOC} & \quad \# \quad [ \text{WARD LOC} \quad \# \quad \text{TO-AT LOC} ] \\
\text{SEP} & \quad \text{i} \quad \text{TO-AT LOC} \\
& \quad \text{i} \quad \text{WARD LOC} \\
& \quad \text{b-classifier forehead} \\
& \quad \text{r.p. clitic} \\
\end{align*}
\]

\[
\begin{align*}
\text{verb} & \quad \text{pronoun} \\
\text{\textbackslash KNow PRO} & \quad \Rightarrow \quad \text{KNOW-PRO} \\
\text{'know pronoun-obj.'}
\end{align*}
\]

In the next example, the subject pronoun and the verb are contracted. The same shift in the position of KNOW occurs as a result. However, another change occurs as well. This time the pronoun is not in a position which receives stress and a deletion occurs. But notice that it is not the entire pronoun which deletes, but only the material in the theme position of this pronoun. The theme of the verb KNOW eventually spreads to fill the
vacant theme position of this pronoun; and, thus we get the
movement to the pronoun location and the movement of the verb
itself all signed with the b-classifier. This spreading of the
theme is not indicated in the example.

29. SUBJECT PRONOUN CONTRACTION WITH KNOW:

\[
\begin{array}{c}
\text{PRO KNOW} => \text{KNOW} \\
\text{'pronoun-subj. know'}
\end{array}
\]

In a subject pronoun contraction, the only remaining evidence that
KNOW is really body anchored is that the b-classifier (the
four-fingered plane) retains its orientation toward the location of
the role prominence clitic and moves toward it with a small bending

20. Notice the position of the role prominence
clitic in this example. It is initial despite the fact
that the verb follows the subject pronoun. If the
pronoun were not cliticized, the ordering would be
pronoun-clitic-verb. Pronouns are phonological
clitics. They are stressless and if unmarked for
emphatic stress, they must attach to to an adjacent
word to be realized. They can be word initial or word
final. The role prominence clitic, however, is a
grammatical pronominal clitic much like clitics in
Romance languages, a property it shares with another
class of clitics, classifier clitics, which have not
yet been introduced. These clitics are case markers
and function as AGR—agreement markers that can
condition pro-drop. These clitics must always be word
initial and verb initial. Thus, when one of these
criticize to the verb to form a single phonological
word, it must precede this entire unit, irrespective of
whether it marks subject or object.
of the wrist. The best test case involves a second person pronoun, because the role prominence clitic is never co-indexed with the second person, yet the contracted form of the verb still assumes the second person location. Signing KNOW with an orientation and slight movement of the b-classifier toward the location of any pronoun (i.e., actually agreeing with a pronoun) which is not co-indexed with the role prominence clitic is indisputably ungrammatical.

Thus, we can exclude contraction cases as apparent violations of the body anchor restriction mentioned earlier and maintain the claim that this restriction is inviolable. This gives us a test for body anchored verbs which will prove to be helpful in our analysis of INFORM.

2.5.2 Evidence From Two Handed Variants Of INFORM.

Armed with knowledge about KNOW and the properties of body anchored signs, we can return to our claim that INFORM is actually a compound: KNOW+GIVE-OUT. This evidence comes from the two handed variant of INFORM in three of its inflectional forms. These examples pose several problems for the analysis which treats INFORM as GIVE-OUT with its source LOC associated with the forehead.

2.5.2.1 The Symmetry Problem -

The first problem concerns an asymmetry between the articulations of the two hands. In the two handed articulation of INFORM, the dominant [21] hand performs the same articulation it
did in the one handed variant. A generalization has been made
concerning two handed signs. It is called the Symmetry Condition
(see Battison (1978), Wilbur (1979) and Baker and Cokely (1980))
and states that if both hands move, then they will have the same
handshape and the same type of movement. The symmetry condition
does not require that the articulations performed by the two hands
be absolutely identical. For example, two hands with identical
handshapes and movements can move in opposite directions. They can
also originate or end in two different locations. These deviations
generally occur in particular two handed inflectional forms (dual
number agreement, reciprocal agreement).

In INFORM, the two hands have the same handshape, the same
movement, move in tandem and originate and end at the same LOCs.
The only difference is that the source LOC for the dominant hand
portion of the sign is associated with the forehead (i.e., it is
identical to the single handed version of INFORM) and the source
LOC for the non-dominant hand is associated with the chest. This
difference is allowed by the symmetry condition, but, if INFORM
really is not a compound, it poses serious problems for the
analysis to be proposed here.

Movements from or to two different LOCs occur in dual
inflections. Movement between two LOCs, but in opposite
directions, occurs in the reciprocal inflection. In such cases,

21. The dominant hand in a two handed sign is
generally correlated with the handedness of the
signer—the right hand for a right handed signer; the
left for a left handed one. However, it is very common
for signer's to switch dominance for a variety of
reasons in the course of their conversations.
there are morphological rules which, usually by means of
reduplication (see Kegl (1981)), add additional movements and LOC
positions. In such forms there is potential for either sequential
or simultaneous production. For example, in the sign 1st
person-GIVE-2nd person-dual, either both hands simultaneously make
the sign 1st person-sg.-GIVE-2nd person-sg., one hand ending at
LOCi and the other ending at LOCj; or, a single hand successively
articulates each part of the sign, first ending at LOCi, then at
LOCj. It is also possible for two different hands to make the sign
in quick succession. If a temporal separation between the parts of
the "giving event" is to be conveyed, then the sequential form of
the sign will be preferred.

There is no inflectional form which can be used to account for
the asymmetry in INFORM. It is almost like any other two-handed
basic sign, but not quite.

Two handed articulation is possible with all the signs
discussed. When used with literal forms like MOVE, CARRY-BY-HAND
or HAND-OVER, two handed articulation indicates the handling of
large objects. With GIVE, GIVE-OUT and INFORM, two handedness
indicates formal signing (signing that would be used in a
theatrical performance, a lecture or a large meeting; or, it
indicates emphasis). GIVE-OUT and INFORM tend, for the most part,
to use the two handed form. In such two handed signs, the second
hand has no morphological significance in terms of number agreement
or person agreement. [22] The second hand is just a mirror of the
dominant hand. With true two handed basic signs, simply marking
the sign as two handed will suffice to indicate this difference.
See GIVE-OUT (two handed) below:

30. GIVE-OUT (2 handed):
---------------------

INFORM, however, would require the following complicated representation to indicate the independent body part association of the two source LOCs.

31. INFORM (2 handed)—hypothetical form:
---------------------

NOTE: a = dominant hand
b = non-dominant hand

Such a notation is not unheard of in ASL, but is equivalent to

22. We are referring to the basic form of the two-handed sign INFORM, not to other variants like the sign meaning "to inform a large group," where the second hand is significant.
doubling the sign. Normally, such signs are interpreted as conjunctions of two signs; one articulated by each hand, but simultaneously.

Consider the sign meaning "to be sick" which is glossed as SICK. This sign has a double handed articulation where the movement of the dominant hand ends at the forehead and the movement of the non-dominant hand ends at the stomach. SICK is formationally similar to KNOW in the sense that the hand orient toward and moves to its LOC. In fact, the dominant hand articulations are identical except for the choice of classifier. Instead of the flat hand (b-classifier), SICK uses the middle finger (open 8-classifier). [23] The middle finger, like the index finger (g-classifier), classifies long thin objects. Choice of the open 8-classifier, however, is an abstraction marker; roughly it functions as a deictic marker pointing out intangible objects. The unmarked interpretation of this classifier is related to "feeling or sensation" (SICK, TOUCH, PITY, EXCITED, DEPRESSED, WORRY, SENSITIVE, LIKE, HATE); but it also shows up in signs relating to an "absence or lack of something" (EMPTY, BALD, STRIP, STREAK, MIND-A-BLANK, USED-UP, LACK, CUT-CLASS). The sign for SICK appears below:

23. The middle finger is the salient part of this classifier. This finger is perpendicular to the palm. The remaining fingers are spread apart, forming a plane with the palm. They are not the "focus" of the sign. Orientation and place and manner of contact are determined by the middle finger (see Mandel (1981)).
32. SICK (2 handed):

Contrary to INFORM, this sign does behave like the overlaying of one sign "to be sick at the head" upon the other "to be sick at the stomach." SICK passes the sequencing test as well. [24] In encumbered signing [25], signing with only one hand, the non-dominant articulation can be dropped completely (the preferred form), or the dominant hand can first sign "sick to the head" and then sign "sick to the stomach." Below are two signs, the sequenced form of SICK and the ungrammatical sequenced form of INFORM:

24. This sign for SICK is not accepted by all signers. For many, it has been reanalyzed as a two handed sign with both LOCs orienting toward the forehead. This reanalyzed form, like INFORM, does not allow sequencing. It also shows the same asymmetry in terms of proximity of the two hands to the forehead. It appears that doubly body part associated signs which are not the result of some inflectional process like number agreement or reciprocal marking, tend to be disfavored.

25. It would be highly impractical if signing depended upon the use of both hands. Any other use of the hands would then hinder communication. Luckily, one handed signing is perfectly intelligible, although sometimes simultaneous articulations of two hands are replaced by sequenced articulations of a single hand. Sequenced signing provides a fairly reliable test for distinguishing basic two handed signs from inflected signs (dual and reciprocal) and conjunct signs (like SICK).
33. SICK (1 handed, sequenced):

\[
\begin{align*}
\text{AT LOC} & \quad \# \quad \text{WARD LOC} \\
\text{SBP} & \quad \text{TO+AT LOC} & \quad \text{open 8-class. forehead} \\
& & \quad \text{open 8-class. stomach} \\
\end{align*}
\]

34. INFORM (1 handed, sequenced):

\[
\begin{align*}
\# \quad \text{AT LOC} & \quad \# \quad \text{AT LOC} \\
\text{SBP} & \quad \text{b-CL/thumb-CL} \\
\end{align*}
\]

\[
\begin{align*}
\text{LOC} \quad \text{WARD+FROM} & \quad \text{TO+WARD LOC} + \\
\text{forehead} & \quad \text{chest} \\
\text{WARD LOC} & \quad \text{up} \\
\text{ON LOC} & \quad \text{LOC ON+FROM [reciprocal]} \\
\text{thumb-CL/thumb-CL} & \quad \text{thumb-CL/b-CL} \\
\end{align*}
\]

\[
\begin{align*}
\text{AT LOC} & \quad \# \quad \text{LOC WARD+FROM} & \quad \text{TO+WARD LOC} \\
\text{chest} & \quad \text{chest} \\
\text{WARD LOC} & \quad \text{up} \\
\text{ON LOC} & \quad \text{LOC ON+FROM [reciprocal]} \\
\text{thumb-CL/thumb-CL} & \quad \text{thumb-CL/b-CL} \\
\end{align*}
\]

**NOTE:** CL = classifier

INFORM clearly fails the sequencing test. It is in no way a conjunction of INFORM and GIVE-OUT; i.e., GIVE-OUT from the forehead and GIVE-OUT from the chest.

We are left with several options. One is to assume INFORM to be a compound. In this way, the association of the dominant hand with the forehead reflects the fact that its initial member is KNOW. The transition between KNOW and GIVE-OUT is smoothed by the progressive assimilation of the handshape handshape of KNOW to the
handshape of GIVE-OUT, and the regressive assimilation of the
initial body part location of GIVE-OUT to the body part location of
KNOW (chest = forehead). Since KNOW is a one handed sign this
assimilation would apply only to the dominant hand. The
non-dominant hand retains all the characteristics of GIVE-OUT.
Since this is the analysis we eventually hope to argue for, we will
delay its full explication until all the evidence has been
presented.

A more conservative option is to assume that the second hand
of INFORM is actually associated with the forehead and that its
lowering is just a phonetic reduction. This is not implausible.
Signs associated with the forehead often lower in informal signing.
For example, the sign KNOW is frequently made at the cheek, as are
many other cognition signs: THINK, SUPPOSE, IDEA, etc.. In formal
signing, the hand returns to the forehead position. The
non-dominant hand of INFORM does not return to the forehead in
formal signing. [26] This only weakly disfavors the phonetic
reduction option. In fact, the reanalyzed two handed form of SICK
mentioned above also behaves like INFORM. The non-dominant hand
does not end at the forehead position, even in formal signing.
Another principle comes to bear on these data. There is a tendency
for signs associated with the head to be one rather than two
handed. This follows from the fact that the head falls into the
target area of foveal rather than peripheral vision. Signs
articulated on the head fall into the area of highest visual acuity

[26] For a discussion of formal vs. informal
signing see Margutti (1982) and Rimor, Kegl, Lane and
(see Siple (1978a)). The redundancy of a second hand does not serve to aid perception. In fact, it may block important facial expressions. Thus, a physiological or perceptual account of the asymmetry in INFORM still seems plausible. The next two sections will present evidence which will clearly force us to reject this option.

2.5.2.2 The Body Anchoring Problem -

For the next bit of evidence, we will return to our discussion of body anchored signs. INFORM is only partially body anchored. It does not behave quite like a prototypical body anchored word. Such words require co-indexation of the role prominence clitic with a particular LOC on the body anchored sign. This is true for the dominant hand in INFORM, but not for the non-dominant hand. The reciprocal inflection of INFORM with singular first and second person agreement is articulated with the dominant hand performing what looks like the one handed variant of INFORM. The role prominence clitic is co-indexed with the 1st person position. The dominant hand starts near the forehead at this position and moves toward the position of the 2nd person (the addressee). The non-dominant hand starts near chest level at the position of the addressee and moves toward the signer; i.e., jGIVE-OUT1. A hypothetical representation of this non-compound form is given below. The reciprocal indexing of the matrix verb is fully spelled out, with angled brackets indicating each hand.
35. 1st per. INFORM 2nd per. [reciprocal]: (hypothetical)

\[
\begin{align*}
\text{AT LOC} & \quad \# \quad \text{AT LOC} & \quad \# \quad \text{LOC} & \quad \text{WARD+FROM} & \quad \text{TO} & \quad \text{WARD LOC} \quad \text{[recip.]} \\
\triangle & \quad a & \quad \langle i \rangle a & \quad i & \quad \langle j \rangle b & \quad j & \quad \langle i \rangle b \\
\text{SBP} & \quad \text{b-CL/thumb-CL} & \quad \langle \text{forehead} \rangle a & \quad \langle \text{chest} \rangle b & \quad \text{WARD LOC} & \quad \text{up} \\
& & \quad \text{ON LOC} & \quad \text{LOC} & \quad \text{ON+FROM} \quad \text{[reciprocal]} \\
& & & \quad a & \quad \text{thumb-CL/b-CL} (2)
\end{align*}
\]

NOTE: i = 1st person
\quad j = 2nd person

Being a reciprocal, this morphological form will also allow sequencing; but, the second part of the sequence violates the body anchor condition.

36. INFORM (1 handed, sequenced): [reciprocal]

\[
\begin{align*}
\text{AT LOC} & \quad \# \quad \text{AT LOC} & \quad \# \\
\triangle & \quad i & \quad a & \quad \text{SBP} & \quad \text{b-CL/thumb-CL} \\
\text{LOC} & \quad \text{WARD+FROM} & \quad \text{TO} & \quad \text{WARD LOC} & \quad \text{[reciprocal]} \\
\langle i \rangle & \quad \text{forehead} & \quad \text{WARD LOC} & \quad \text{up} & \quad \langle j \rangle b & \quad \text{chest} \\
& \quad \text{ON LOC} & \quad \text{LOC} & \quad \text{ON+FROM} & \quad \text{[reciprocal]} \\
& & \quad a & \quad \text{thumb-CL/b-CL}
\end{align*}
\]

NOTE: CL = classifier
This second conjunct is not a contracted form of any sort. Its source is not body anchored. Furthermore, its goal is co-indexed with the role prominence marker. If the source were co-indexed, the source and goal would be co-referent. This is not the case.

2.5.2.3 The Triple Agreement Problem -

Thus far we have considered evidence against a non-compound analysis of INFORM. It doesn't pattern with other two handed basic signs, poses notational problems because it specifies two distinct body part associations but doesn't share any properties with sign conjuncts like SICK, and it violates the body anchor condition. Below we will consider another problem posed by the non-compound analysis of INFORM, one which leads us to a strong argument in favor of the compound analysis.

Compare the following reciprocal forms: [3rd per. GIVE-OUT 3rd per. [recip.]] and [3rd per. INFORM 3rd per. [recip.]]. In both examples, the role prominence clitic receives a neutral index (represented by the null symbol (Ø). First, consider the reciprocal of GIVE-OUT:
37. 3rd per. GIVE-OUT 3rd per. [reciprocal]:

\[
\begin{align*}
\text{AT LOC} & \quad \text{AT LOC} \quad \text{LOC} \quad \text{WARD FROM TO WARD LOC [recip.]} \\
\emptyset & \quad a \quad \text{chest} \quad | <i>a \\
\text{b-CL/thumb-CL} & \quad \text{WARD LOC} \quad | <j>b \\
\text{sbp} & \quad \text{UP} \\
\text{LOC ON LOC [reciprocal]} & \quad \text{up} \\
\text{LOC ON+FROM [reciprocal]} & \quad \text{LOC} \\
\text{a} & \quad \text{thumb-CL/b-CL} (2)
\end{align*}
\]

NOTE: i and j = two distinct 3rd person locations

'person and person give out to each other'

\[i \quad j\]

The signer's body remains in a neutral position, the same position it is in for first person agreement. This leaves the two verb LOCs neutral in terms of role prominence. The reciprocal of GIVE-OUT is simply the simultaneous articulation of \(i\)GIVE-OUT\(j\) and \(j\)GIVE-OUT\(i\). Nothing out of the ordinary appears in this sign.

Now compare the reciprocal of GIVE-OUT with its counterpart using INFORM. The representation given below does not comply with any ASL word formation rules pertaining to non-compounds. If it were the correct representation of the sign, it could not be accounted for in out analysis for a number of reasons: simple signs allow a maximum of two LOCs in the matrix movement, multiple sources, goals or themes are prohibited within a non-compound sign.
38. 3rd per. INFORM 3rd per. [reciprocal]: (hypothetical)

\[ \text{AT LOC } \emptyset \quad \# \quad \text{AT LOC } a \quad \# \quad \text{b-CL/thumb-CL} \]

\[ \langle \text{LOC WARD+FROM} \rangle + \text{LOC} \quad \text{WARD+FROM+TO} \quad \text{WARD LOC [recip.]} \]

\[ \emptyset \quad a \quad \langle \text{i} \rangle a \quad \langle \text{j} \rangle b \quad \langle \text{forehead} \rangle a \quad \text{WARD LOC} \quad \langle \text{chest} \rangle b \quad \text{ON LOC} \quad \uparrow \quad \text{LOC ON+FROM [reciprocal]} \quad \emptyset \quad \text{thumb-CL/b-CL} (2) \]

NOTE: \( i \) and \( j \) = distinct third persons

'person and person informed each other'  
\[ i \quad j \]

Remembering that neutral position (\( \emptyset \)) is actually a position in the signing space, it appears that the reciprocal of INFORM agrees with three LOCs. The non-dominant hand makes the same articulation described above for GIVE-OUT. It is the dominant hand which poses the problem. The dominant hand starts at the signer's forehead in an upward oriented clamped hand handshape. Remaining in a clamped handshape, the hand moves to location \( i \). At location \( i \) the clamped hand changes course and performs an articulation identical to the dominant hand articulation in GIVE-OUT [reciprocal] above. The clamped hand moves from LOC\( i \) to LOC\( j \) while opening.
We see from this example that INFORM is not itself a body anchored sign, but rather contains within it a body anchored sign (KNOW) and a non body anchored sign (GIVE-OUT). The KNOW portion of the compound must be co-indexed with the role prominence clitic; and it invariably is, even when that role prominence clitic is not co-indexed with a LOC on the verb.

We pointed out earlier that the role prominence clitic cannot be co-indexed with second person. Yet, the LOC associated with the matrix locative relation (WARD) in a sign like KNOW must be co-indexed with the role prominence marker. It is interesting how this conflict is resolved. In a simple sentence like "you know him/her," the role prominence clitic gets a neutral index (Ø). This neutral index signals that the signer's body is left in neutral position—not shifted to any other position. The verb KNOW is also given a neutral index. Thus, the body anchor verb and the role prominence clitic are, in essence, co-indexed. When a verb receives such a neutral index, its interpretation is determined syntactically. Thus, the role prominence clitic is not overtly co-indexed with second person, but it can be interpreted as co-referential with a second person argument.

The reciprocal example mentioned earlier ("person i and person j informed each other"), behaves similarly. The role prominence clitic is given the neutral index, as is the KNOW portion of the compound. The GIVE-OUT portion of the sign still exhibits reciprocal agreement for both the source (informer) and goal (informee). The handling classifier in GIVE-OUT signals the presence of an agent, a role generally construed with source if
source is person marked. The subject, "person i and person j," determines the value of the role prominence clitic. The subject is co-indexed with the source and goal. Thus, we find that both person i and person j get a role prominent interpretation.

Considering the various pieces of evidence presented, it seems that the most reasonable, certainly the least problematic, analysis of INFORM treats it as a compound. Such an analysis avoids all of the problems raised and maintains the mechanisms which limit the number of possible signs: the body anchor condition, the restriction against multiple occurrences of the same thematic role in a single word, the limit on the number of LOCs in a simple sign. etc..

Below is the representation for the compound INFORM and INFORM with reciprocal inflection. Notice that the reciprocal form of this verb is the compound of KNOW plus the reciprocal of GIVE-CUT.

39. INFORM (compound; before any assimilation):

\[
\begin{array}{c}
\text{role prom.} & \text{KNOW} & \text{classifier} & \text{GIVE-CUT} \\
\text{clitic} & \text{clitic}
\end{array}
\]

\[
\begin{array}{c}
\text{AT LOC} & \# WARD LOC & \# AT LOC & \# LOC & WARD+FROM+TO+WARD LOC \\
\text{SEB} & \text{TO+AT LOC} & \text{a} & \\text{chest} & \text{WARD LOC} & \text{chest} \\
\text{b-CL} & \text{forehead} & \text{ON LOC} & \uparrow \\
\text{b-CL/thumb-CL} (2) & \text{LOC} & \text{ON+FROM} & \text{[recip.]} & \text{a} & \text{b-CL/thumb-CL}
\end{array}
\]
Various assimilation rules apply to the dominant hand in INFORM to yield the surface forms we have been describing. The handshape of KNOW assimilates to the handshape at the beginning of GIVE-OUT. The source LOC of GIVE-OUT assimilates to the body part location of KNOW. Thus the dominant and non-dominant hands of the non-reciprocal of INFORM have the following surface appearance. We will not concern ourselves here with the details of phonological processes such as assimilation, except to the extent that such information can help us recognize morphological relatedness in the ASL lexicon.

Below are two examples which illustrate the articulations of the two hands in the surface representation of INFORM. Notice that even though phonological assimilation has occurred, the sign still makes consistent use of the same basic set of motion/location

Signs like the reciprocal of INFORM exhibit overtly the kind of overlapping structures posited in across-the-board analyses (Williams (1978), Goodall (1984)).
formatives. This is a consequence of the fact that there is a near one-to-one relationship between formational units and morphemes in ASL. Even when some formational unit is changed by the application of a segmental phonological rule, it still ends up resembling the surface form of some other morpheme. Such changes sometimes obscure the morphological composition of the sign, possibly leading to reanalysis.

41a. INFORM (dominant hand after assimilation):

41b. INFORM (non-dominant hand):
2.6 CONCLUSION

Close examination of the small set of signs above has raised numerous issues. Some of these issues concern previous problems which are resolvable in this system, while others reflect new problems brought to light by the fine tuned nature of the notational system. Still other issues concern problems left unsolved or those resurrected by the use of such a notation.

We began our discussion with the glossing issue. Is glossing an adequate notational system to be utilized in the linguistic analysis of American Sign Language? Clearly, this is not the case. Glossing totally obscures morphological and formational similarities between signs, preventing us from making any significant generalizations concerning the structural properties of such signs. Our response to the inadequacies of glossing lead us to propose a locative-based notational system. Working through the details of implementing such a notational system has yielded several significant observations concerning the types of formational units which exist in ASL and the nature of their combination and arrangement. For example, signs contain not only temporally ordered sequences of formative elements, but also can contain multiple, simultaneously articulated, temporally ordered sequences.

The most striking difference between glossing and locative based notation concerns the amount of morphological complexity the latter attributes to the sign. The roughest gloss representation of GIVE (i.e., GIVE) represents this sign as monomorphemic. An
expanded gloss notation indicating the anchor points for the
movement of this sign (\texttt{GIVE}) would increase this number to three.
The locative-based notation system proposed here superficially
indicates the presence of 31 morphemes in the sign GIVE. If we
fill in the reduced movements present in purely locative signs [27]
and the word internal indices on each embedded sign (i.e., \texttt{TO+ON}
\texttt{LOCa} instead of \texttt{ON LOC}) and assume the process of reduction (\texttt{TO} \(=\)
\texttt{TW}) to itself be morphemic, the number of morphemes increases to
43.

What evidence is there in favor of such an elaborate,
morphologically complex representation, and to what extent is the
native speaker aware of this complexity? Clearly, signs like GIVE
and INFORM are not created each time \textit{de novo} from some set of
productive word formation rules. They are, rather, independent
entries in the ASL lexicon. Yet, their relatedness to other
lexical entries and to newly created signs which are the output of
productive rules cannot be denied. Processes of reduction and
assimilation apply, but rarely is the sign so drastically changed
that its original morphological make up is obscured.

What role does this relatedness play in moment to moment use
of the language? Not a great deal. Although it is helpful to know
that INFORM, for example, is the metaphorical extension of
GIVE-OUT, to the cognition class—by means of its compounding with
the extensional class marker KNOW; this knowledge is about as
useful to the ASL signer as knowledge of word etymology or details

27. These morphemes were left out of the
representations because of their predictability.
on the combinations of latinate prefixes and stems is to the speaker of English. In fact, just as English speakers are often unaware of sublexical morphological regularities in the words they use— not noticing, for example, any relatedness between the words false and fallacious; signers are equally oblivious to such information; and yet they use the language perfectly well. Recognizing INFORM as a compound of KNOW and GIVE-OUT would probably only occur to those signers, a small few of us, who have studied the historical linguistics of ASL, and have viewed films and analyzed written documents accounting the details of Old ASL and Old French Sign Language. Still, once the sublexical regularities are pointed out to a signer, their existence is clear.

Usually, as sublexical formatives lose their morphological relevance and recognizeability they become more subject to the obscuring properties of historical change. This is happening in ASL, but not to as great an extent as one might suspect. The reason for this, I would argue, is related to the unique role ASL plays in the Deaf Community. [28]

Newport and Supalla (1980) were the first to point out that ASL has a unique property. It continually recreolizes. Only a small percentage (a rough approximation is about six percent) of the Deaf population are born to Deaf parents. (An even smaller number also have Deaf grandparents; i.e., have parents who were

28. We will capitalize the word Deaf when referring to Deaf people or the Deaf Community. This is a fairly standard convention in the literature on ASL linguistic and culture. It is done to reflect a cultural as opposed to clinical or pathological perspective on deafness.
themselves children of Deaf parents.) The remaining are Deaf people whose parents are hearing speakers of English. For the most part, these hearing parents have no knowledge of American Sign Language and no connection with the Deaf Community. As a result, the number of deaf users of ASL who learned this language at home from their parents or siblings in the way most natural languages are learned is rather small. This small group is the group most frequently studied by ASL linguists. This dissertation is no exception. Such discrimination is an attempt to limit, in some systematic fashion, the amount of variation present in the data to dialectal variation rather than age of acquisition, degree of exposure to the language or educational factors. It also increases that chances that the cause of deafness is hereditary and is not complicated by other concomitant problems resulting from some illness, accident or birth trauma.

All this aside, it is the heterogeneity of the Deaf community which makes it so interesting. At any one time, there are always more non-native than native signers present in the population. How does ASL survive in such an environment? How does it remain so stable? How does it retain its unique morphological and syntactic properties despite a rather inconsistent and non-optimal input to any generation of children learning the language. Remember that even the Deaf parents of Deaf children are usually themselves non-native signers (i.e., the children of non-signing hearing English speakers). Even the children of native signers are exposed to this inconsistent input since their primary linguistic input is not just their parents, but the Deaf community as a whole.
Yet, children of Deaf ASL signers, irrespective of whether those parents are native or non-native in their fluency, pattern alike. They both exhibit native-like ability in the language. It has been proposed that this is because each generation of children learning ASL from birth actually re-creolize the language.

We will address the nature of this re-creolization process later, particularly how all these re-creolizations come out looking alike. But, first let's get an idea of the kind and quality of varied input available to the Deaf child. First, consider the language exposure possibilities available to the Deaf children of hearing parents who do not sign. This will give us an idea of the variation present in the parent generation.

Below I will sketch a hypothetical spoken language equivalent to the situation where a Deaf child is born to two hearing parents. Suppose two parents whose native language and culture is English had a child who only had the potential for learning spoken Italian. This child might at some stage be able to learn to write English, but could never process or produce spoken English. Suppose also that the parents don't realize their child's particular problem until it is two or three years old. They behave like any other parent talking to and playing with their child, but the child doesn't seem to be picking up English. When they finally realize there is something wrong, they are advised that they can either send their child off to some Italian speaking community or they can send it to a school where it can at least be taught written English. Furthermore, they are told that teaching the child written English is a tricky process (only 30% succeed at learning
written English) and will only work if they start right away. If
this system fails, they are told, they can always fall back on
sending their child to the Italian speaking community. Of course,
then the parents would have to learn Italian, and they would never
be able to communicate with their child in their own native
language. So, off the child goes to the school for written
English. Now we have two possible scenarios. Either the child
learns written English or it doesn't.

Let's say the child is in the 30% success group and learns
written English. Of course, this person can only communicate with
someone if they are willing to write everything down. People are
accommodating, but they tend to write down things that are
important. It's the rare friend who just sits around writing
casual conversation. When a lot of people are talking, very little
gets written down—or only bits and pieces. This person either
puts up with the frustrations of communicating in written English
for the rest of her life or she now goes off and tries to learn
spoken Italian and starts to associate with people who use spoken
Italian. Of course, depending upon when she starts to learn the
language, her fluency may never be comparable to that of a native
speaker. In fact, she will always be recognizable as a second
language learner of Italian.

In the second scenario, the child doesn't succeed in learning
written English. In the worst case, this person never goes on to
learn Italian and just gets by with alternate communication
skills—miming, drawing pictures, using bits and pieces of English
writing (a word here and there) to get the point across; but, for
the most part this person is ailing linguistic and illiterate. In the
lucky case, this person can still be highly communicative with the
modes at her disposal (mime, etc.). In the unlucky case, we have a
person who cannot communicate at all. Both of these people will be
referred to as having minimal language skills, but the former is
said to have "high communicative skills" and the latter "low
communicative skills."

It is also possible in the second scenario that the child who
doesn't succeed at written English goes off and tries to learn
Italian. Again, depending upon the age at which this happens and
the consequences of early language deprivation, this child might
have the same potential for mastering Italian as the child who
mastered written English, or may not.

For parents who are not satisfied with any of these
alternatives, there is another school which tries to offer a bit of
both. The school teaches written English but supplements it with a
spoken Italian equivalent of English. As the children write
written English, they are taught to pronounce an Italian-based
gloss of the English words they are writing down--word by word, or
when possible, morpheme by morpheme. Actual spoken Italian is
never used, just the Italian-based glossing system. The
pronunciation of the Italian-based gloss clearly has no connection
to the pronunciation of the written English. The children in this
school can write to anyone who can write English (provided they
master this part of their education) or they can talk to anyone who
knows English and has learned this Italian-based system for
glossing English words and morphemes. Sometimes the children learn
the Italian-based glosses for words but don't fully master English syntax. Other times they learn English fairly well, but the glossing system doesn't really give a full morpheme by morpheme account of English. Endings are dropped off. Sometimes the same gloss labels several related words. Sometimes the sequence of Italian-based glosses are themselves difficult to articulate because of the sounds that are adjacent as a result of their combination. Remember the English equivalents involve completely unrelated sequences of phonemes.

In some instances the system for choosing the Italian-based glosses is a bit strange. Some of the schools choose glosses that are semantically near the meaning of the word or morpheme to be glossed. Other schools use the following system which they call "Glossing Exact English." English morphemes can be similar to one another in three different ways: they can sound alike, look alike (be spelled the same) or have similar meaning. If any of these relationships hold, then the same Italian word or morpheme can be used to gloss the English equivalent. Let's say we were using Italian to gloss the English word *justice*. This word could be glossed by a combination of the Italian word meaning "just" and the Italian word meaning "ice," even though neither of these morphemes have anything to do with the word *justice*. The Italian word meaning "just" will also gloss the English word *just*. Thus, the two forms which are written alike will also be pronounced alike, even though the pronunciation used will in no way be related to the actual pronunciation of English. If this is confusing, then my point is made.
Anyway, children with this background could also eventually go off and try to learn Italian and join the Italian speaking community. Except for some experience pronouncing the language, they would be in the same boat as the other two groups in terms of their preparation for learning Italian. The only possible difference is that they might have been exposed in a rather haphazard way to enough data from Italian to begin to make certain generalizations concerning sublexical regularities in the language.

In the above discussion substitute spoken and written English for written English, American Sign Language for Italian, Deaf Community for Italian speaking community, Signed English for Italian-based glossing of English, and "Signing Exact English" for "Glossing Exact English," and we have an account of the actual state of affairs in the signing community and in Deaf education in the United States. I have chosen to give a spoken language equivalent to illustrate the actual language situation in the Deaf Community because people hold so many misconceptions concerning the nature of the natural language, American Sign Language, and the many forms of manually coded English which have borrowed uninflected ASL signs to gloss English words and morphemes. Consider it an exercise in "phenomenological linguistics." [29] The only modification to get the true spirit of the enterprise would been to have chosen a language less like Italian, one with less

29. A phenomenological account in anthropology attempts to describe a culture or cultural experience, not by merely relating the actual events observed or experienced, but in attempting to recreate in the audience the same reaction to the event or experience by translating the event into a situation in their own culture which they would perceive and react to in a similar fashion.
prestige and whose community of speakers exists within another dominant culture and language community. Most creoles would do nicely.

ASL is a creole (see Fischer (1978)). Historically, it is a creolization of Old French Sign Language and an indigenous sign language of which we have little information (Woodward (1978)). More interesting than ASL's status as a creole, is the claim that ASL is recrrealized with each new generation. It is with respect to this recrrealization process that the morphological complexity internal to the ASL sign plays a central role. The internal complexity frozen within the lexicalized sign, which is unrecognized and unanalyzed by the second language learner of ASL, encodes syntactic and morphological characteristics of ASL grammar. Even though the input to a first language learner may be non-optimal in the sense that the role models do not use the full range of grammatical devices available in ASL grammar, it appears that the first language learner performs some analysis on these frozen forms and as a result certain grammatical structures of ASL not present in the signing input appear in the language of the child.

Recreolization is a second generation phenomenon. The deaf child of non-signing, hearing parents rarely attains first language competency in ASL. However, the deaf or hearing child [30] of such signers, exposed only to non-native input, generally does exhibit

30. Not all hearing children of Deaf parents are encouraged to learn ASL. In many instances, the Deaf parents will sign or speak only English to them. These children will obviously not recrrealize ASL.
native competency in ASL.

Consider the input to these recreolizers: parents, peers and the Deaf Community. First, we have the parents who are deaf offspring of hearing parents. They vary in background in the same way as the individuals born with the potential for speaking Italian, but not English in our hypothetical example above. They are generally bilingual [31] in ASL and English, but this does not imply that they are equally fluent in these two languages; or even that they exhibit native fluency in either one. In fact, for many of these first generation signers, comparable to first generation immigrants, ASL is a second language and some may never reach total fluency. For them ASL functions as a "fossilized interlanguage."

According to Selinker (1972), as a learner acquires a second language, he or she passes through various stages before acquiring native-like competence (see also Corder (1967), Nemser (1971) and Richards (1972)). He defines an interlanguage as a separate language system which results from a learner's attempted production of a target language. Sometimes the learner stops learning after reaching a certain level of fluency, and the interlanguage becomes fossilized. This fossilization is frequently a result of the speaker's realization that he or she knows the language well enough to communicate. Factors which contribute to this fossilization are the area and pattern of settlement, the group's numerical strength,

31. We will take our definition of bilingualism from Grosjean (1982) who does not restrict the term bilingual to only those individuals who have native mastery of their two languages, but rather includes the more case where the speaker of multiple languages has varying mastery over them.
educational level and cultural cohesiveness; and, perhaps most important, the degree of integration into the majority group (Richards (1972)). For an overview of bilingualism and a review of the literature on interlanguages see Grosjean (1982).

For our purposes, it is enough simply to recognize that such non-optimal variants of a language can exist and that a sizeable number of first generation signers use ASL as a fossilized interlanguage. Given the high percentage of first generation signers within the Deaf Community, it follows that the Deaf child of first generation signers will see fossilized or second language variants of ASL more frequently than native ASL. In fact, the Deaf child of third, fourth or fifth generation signers will also have exposure to this same heterogeneous Deaf Community. Since children appear to acquire language not so much from their parents as from their peers, it is understandable why second, third, fourth and fifth generation signers pattern alike. What's not clear is why ASL is not undergoing a process of rapid change such that the morphological and syntactic characteristics of the ASL of native signers—the grammatical properties absent in the majority of first generation signers—are quickly dropping form the language. In otherwords, why does ASL resist change?

Two factors may be at play here. The first concerns the apparent homogeneity of creoles despite their isolated occurrence. The second relates to the accessibility to the first language learner of frozen morphological and syntactic complexity.
Cresoles, although they arise under diverse conditions and in totally isolated locations, appear to share certain basic structural characteristics. This typological affinity can only be accounted for if we assume that the creolization process falls back on certain innate, unmarked grammatical principles (a "bioprogram" for language) which are shared by all acquirers. Thus, ASL as a creole will share characteristics with spoken language creoles; and furthermore, each subsequent recreolization of ASL will share characteristics with the ASL creole of previous generations.

In Gee and Kegl (1982b), we proposed that because ASL is constantly acquiring new signers from the pool of Deaf children born to hearing, non-signing parents, and because the input to these children is highly variable and inconsistent, it stays closer to this "unmarked bioprogram for language" (in the sense of Bickerton (1982)). The fact that ASL is "discourse-oriented" as opposed to "sentence-oriented" may very well be related to its repeated reacquisition. The existence of morphological processes like reduplication may also follow from this. Furthermore, the morphological regularity and the simplicity of word formation processes may be a consequence as well.

The claim that tends to reflect an "unmarked bioprogram for language" was further supported by Goodhart (1984) who, working within the Gee and Kegl framework, compared the acquisition of ASL by Deaf children of Deaf parents and Deaf children of hearing parents. [32] Goodhart, however, attributes too much to the

32. See Goodhart (1984) for a substantive review of the creolization issues as they pertain to ASL.
creolization process, while ignoring the information concerning morphological and syntactic structure which is frozen into lexicalized signs. She argues that the agglutinative characteristics of ASL recreations follows from biological constraints on the language. Reliance upon innate mechanisms in the creolization process will not invariably result in an identical language system, thus input does play some role. However, Goodhart argues that the morphological complexity in ASL results not from the input, but follows from physiological properties of ASL. She cites Slobin's (1977) four charges to language that are based on human cognitive prerequisites: 1) be clear; 2) be humanly processable in ongoing time; 3) be quick and easy; and 4) be expressive. Since signs are articulated with the large muscles controlling the hands and arms, ASL sign will take considerably longer to articulate and thus if ASL is to be "quick, easy and expressive," it must convey more information per word (see Bellugi and Fischer (1972)). In fact, she argues that Deaf children exposed to Signed English, which like spoken English has an isolated (non morphologically complex) rather than agglutinative (morphologically complex) morphology, will also becreolized toward an agglutinative morphology. This claim follows from her assumption that visual languages cannot be isolating or their speed of transmission would be greatly slowed; and, thus, manual codes for English, even though consistent, constitute an inadequate input to the Deaf child.
Manual codes for English are visually cumbersome, but still some children do master these systems. Frequently, their response to the memory demands and production speed problems is to drop off morphological endings corresponding to -ed, -er, es, ing, 's, etc. and rely on context or concurrent mouthing or voicing of English words. They don't necessarily recerealize ASL or increase the morphological complexity of Signed English. At a very early stage children exposed to manually coded English do seem to pattern like children learning ASL, but this is probably related to the fact that both at this point are relying on the "bioprogram" and the parameters which distinguish the two languages are not yet set. Furthermore, both are at the stage of acquiring words and of noticing structural regularities in the lexicon. In some cases the structural regularities noticed will result in overgeneralizations which will have to be unlearned.

In looking at morphological complexity in ASL, I will restrict my discussion to children who recerealize ASL from a non-optimal input which approximates ASL and not confuse the issue with the acquisition of manually coded English. Still, the discussion of word internal accessibility to morphological and syntactic generalizations can account for the initial appearance of morphological complexity in the signing of children acquiring manually coded English. This is because although Signed English signs are treated as monomorphemic and non-morphologically complex, these signs are borrowed from ASL. Even though the borrowed forms are not inflected for agreement or aspect, they still have frozen within them evidence of these constructions because the ASL signs
to which they correspond frequently have complex themes which are nominalizations of sentential verbs (a verb plus its classifier clitic). These sublexical units, although irrelevant for the syntax of the matrix sentence in which the word occurs, still exhibit morphological and syntactic structures relevant to the grammar of ASL—particularly information concerning the systems for case marking, thematic role marking and aspect marking. The child learning English will eventually need to learn that this information is irrelevant or in conflict with realization of case marking and thematic role assignment in English. Even though she is exposed to a non-optimal and inconsistent input, the child recreating ASL will get consistent information from these sublexical constructions which may very well influence the setting of parameters and thus characterize the final state attained in the language acquisition process.

For this reason, it is valuable to examine the sublexical structure of the ASL sign. In conjunction with repeated recreolization, sublexical structure may very well be the key to the stability of ASL. What may be completely ignored by a late second language learner, can serve as the cornerstone of the first language learner. In the next chapter, we will systematically survey the structural characteristics of ASL signs while introducing data from a fragment of the ASL lexicon—the verbs. The formational characteristics which will be discussed hold for all the words in the ASL lexicon, not only the verbs.
CHAPTER 3

AN INTRODUCTION TO THE ASL LEXICON

3.1  A SCHEMATIC INTRODUCTION TO THE ASL LEXICON.

This chapter consists of two parts. In Part I structural characteristics of the ASL lexicon will be introduced in schematic terms; focussing upon what types of structures occur, what co-occurrence restrictions appear to exist with respect to combinations of various formative elements and, finally, what sorts of linear arrangements and non-linear arrangements of formatives are possible. Schematic representations rather than specific examples are introduced to represent whole classes of words with shared structural characteristics. There exist many classes of words beyond those which refer to literal motion and location, but these words all extend metaphorically from the same class of literal motion/location words. Structurally, they are identical. Their extension involves association with some body part which marks them as a member of a particular semantic field (i.e., head=cognition, eyes=vision, chest=emotion, mouth=location, ears=audition, etc.); compounding with some extensional class marker, i.e., a prototypical word from an extended class--THINK
(cognition), TOUCH/FEEL (emotion), etc.; or, incorporating into one word, some other word which is associated with an extended class. [1]

In Part II the schematic sketch of ASL sign types will be fleshed out by actual examples from the class of ASL verbs. We will conclude by considering three types of examples which, although structurally distinct, all appear to be single signs: complex signs (single signs with LOCs for both source and goal); compound signs and two sign sequences. A phonological rule of theme chaining which blends like themes across a word boundary obscures the distinctions between these signs. However, they behave differently with respect to co-occurrence restrictions on locative/directional morphemes, the position at which clitics occur and the number of clitics allowed.

3.2 PART I: A SCHEMATIC INTRODUCTION TO SIGN STRUCTURE

Let's begin with a few terminological distinctions. This chapter makes reference to various sorts of words: simple words, complex words, compounds, phonological words and contractions. Simple words are those words which contain a single movement (TO or FROM), a single locative argument marker (LOC), a single Terminator (IN, ON, AT, or WARD), and a single moving element or theme (a classifier or another word). Complex words contain two movements (TO and FROM), two terminators (any of the set {IN, ON, AT and WARD}), or two tokens of a single terminator (i.e., two ATs), but a single

1. For a more extensive discussion of metaphorical extension in ASL see Gee and Kegl (1982b) and Dexter (1982).
Theme. Compounds are combinations of words, which in terms of stress and for purposes of clitic placement, behave as a single word. They look like single words, but characteristically allow more than one theme or combinations of movements which would be prohibited in a simple or complex word. The term, phonological word, refers to a word plus its clitics. Clitics are words which have no inherent stress and, therefore, must attach to an adjacent word. Finally, contractions involve a special kind of cliticization of pronominals or the negative (NOT) to an adjacent word. The sign NOT (an all purpose negative) optionally contracts; and the pronominals, unless marked with emphatic stress, obligatorily contract.

3.2.1 The Simple Sign

Every word in ASL has minimally four parts: a Movement (M), a Terminator (T), a locative argument marker (LOC) and an element which co-occurs with the motion of the verb (THEME). A list of the morphemes which can fill these positions in a word appears below:
COMPONENTS OF THE ASL SIGN

<table>
<thead>
<tr>
<th>PHYSICAL REALIZATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MOVEMENTS:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TO</strong> movement to a location</td>
<td>movement to a goal</td>
</tr>
<tr>
<td><strong>FROM</strong> movement away from a location</td>
<td>movement away from a source</td>
</tr>
<tr>
<td><strong>TERMINATORS:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>WARD</strong> orientation toward a location</td>
<td>to be oriented toward a goal</td>
</tr>
<tr>
<td><strong>IN</strong> locating in a bounded space</td>
<td>to be in something</td>
</tr>
<tr>
<td><strong>ON</strong> locating on a surface</td>
<td>to be on something</td>
</tr>
<tr>
<td><strong>AT</strong> pure locating</td>
<td>to be at a location</td>
</tr>
</tbody>
</table>

**LOCATIVE ARGUMENT MARKER:**

| LOC a location in space                   | the reference point of movement or location |

**THEME:**

- **b-classifier** flat hand flat surface
- **g-classifier** index finger extended long thin object
- **s-classifier** closed fist round solid object
- **r-classifier** 1st and second finger crossed twisted object

etc.

Figure 1.

The Movement forms the base of the sign. The locative argument marker (LOC) temporally precedes or follows this base, serving as an anchorpoint (source or goal) for the movement. The Theme is a classifier (or entire word) whose articulation exactly
co-incides with the articulation of the movement element and its terminator. It is in fact realized by the same articulator(s) (left hand, right hand or body). We represent this co-incidence relation by a triangle under the Movement. This triangle dominates the simultaneously articulated material constituting the Theme. The Terminator intervenes between the Locative Argument Marker and the Movement, behaving, in fact, as part of the Movement. It specifies the spatial relation which the moving theme holds at the termination point of its movement (i.e., the LOC which serves as its source or goal). The Theme can be located at this location (AT), in something at this location (IN), in contact with something at this location (ON) or oriented toward this location (WARD).

Schematic representations for two possible realizations of simple ASL words appear below. Notice that they are mirror images of one another.

**SCHEMATIC REPRESENTATIONS OF THE ASL WORD:**

---

a. \[ M + T - \text{LOC}_1 \]

\[ \text{THEME} \]

b. \[ \text{LOC}_j - T + M \]

\[ \text{THEME} \]

\( M = \text{Movement} \)

\( T = \text{Terminator} \)

\( i,j = \text{Indices which associate LOCs to specific positions in the signing space [2]} \)

**Figure 2.**

The schema in (a) above is the configuration which occurs when the movement base is TO and the schema in (b) is the configuration which occurs with FROM. TO and FROM are the only basic movement
morphemes in ASL. Actually, distinguishing the two movement roots, TO and FROM is redundant and they should be collapsed into a single root MOVE. Such a distinction follows automatically from the relative ordering of the Movement and the Locative Argument Marker. If the LOC temporally precedes the Movement (i.e., LOC...M), then the LOC is interpreted as a source and the Movement as FROM. If the LOC temporally follows the Movement (i.e., M...LOC), it is taken to be the goal and the Movement is assumed to be TO. The interpretations of the Movement (M) and the Locative Argument Marker (LOC) are inherently linked. We neither need to label LOCs as sources or goal nor to label Movements as FROM vs. TO. Both notions are derivable from the relative ordering of MOVE and LOC. Arguments in favor of collapsing FROM and TO will appear in Chapter 4 (in the section on Level Ordering) and in a later section of this chapter discussing negated verbs. For now, however, TO and FROM will be distinguished in our presentation of the data, in the hopes of making the examples easier to read.

2. We will examine these indices in detail in Chapter 4 in our discussion of Number Agreement. We will use \{i,j,k...n\} to represent distinct index points which can later be associated with actual locations in the signing space which exists in a horizontal plane slightly above waist height in front of the signer. These actual locations will be represented by numbers. In other words LOCi could be later co-indexed with any of an infinite number of points in the signing space \{(1,2,3...n)\}. Positions above and below the horizontal plane can also be indexed by a process of linked indexing which indexes a position on some object which is already indexed relative to the horizontal plane. Real world objects actually present in the signing environment can also serve as index points. The role of indices in anaphoric processes, binding theory and control theory will be explored in Chapters 6-7.
that the Terminator always appears between the movement and the LOC. This positioning makes a certain amount of intuitive sense, since the terminator actually specifies the relation between these two elements. It tells us how the movement terminates—whether it ends at a point internal to something (IN) or in contact with something (ON); whether the movement ends at some location without any reference to whether it is internal to or in contact with some object at that location (AT); or whether the movement never reaches its location, but rather, the theme moves into a position such that it faces in the direction of its location.

There is a set of examples, the set of purely locative signs, where the Terminator alone appears to constitute the base of the sign. Such words are stative: locative verbs, nouns, classifier clitics, the role prominence clitic, etc.. These signs are notated in the following manner:

**SCHEMATIC REPRESENTATION OF PURELY LOCATIVE SIGNS:**

\[
\begin{array}{c}
\text{a. T - LOC} \\
\text{THEME} \\
\end{array} \quad \begin{array}{c}
\text{b. LOC - T} \\
\text{THEME} \\
\end{array}
\]

T = Terminator

**Figure 3.**

Figure (a) as we discovered in Chapter 2, corresponds to signs like BE-AT 'to be at', BE-ON 'to be on', BE-IN 'to be in' and BE-ORIENTED-TOWARD 'to be oriented toward'; and Figure (b) corresponds to the class of signs indicating separation such as the classifier for handling wide or large objects, the sign meaning 'to
be agape' (the locative version of the verb JAW-DROP discussed in Chapter 2), BE-APART, BE-ACROSS-FROM-EACH-OTHER, BE-IN-FRONT-OF, etc.. The above schemata also form the basis for most of what are identified as nouns in ASL, even though they might be considered a type of locative verb. Recall the examples previously given for Mary and Sue. The sign for Mary is repeated below:

1. MARY (fingerspelled)

\[
\text{AT LOC} \quad \emptyset \\
\text{m-a-r-y}
\]

In the above example, "AT LOC∅" functions like an affix which marks nominals. And, in a sense, we can think of nouns as all sharing the following structure:

NOUN FRAME:
---
NOMINAL= classifier, noun, or nominalization

\[
\text{AT LOC} \quad \emptyset \\
\text{NOMINAL}
\]

Figure 4.

To illustrate this point ans to introduce a little information about nouns in ASL, let's consider a fairly complicated example, the sign for the noun CUP, which we will sometimes abbreviate as follows; for reasons which will quickly become apparent.

2. CUP (abbreviated representation):

\[
\text{AT LOC} \quad \emptyset \\
\text{CUP}
\]
The sign CUP, unlike its English counterpart, is not monomorphemic. In fact, it exhibits a surprisingly complex sublexical morphological structure. In a nutshell, CUP is the nominalization of the reduplicated ASL sentential verb meaning "a rimmed object is on a flat surface." Such a verb is most frequently found in sentences like the ASL equivalent of: The cup is on the table. However, being composed of classifiers, such a verb is not restricted to referring to cups and tables." Out of context, however, the "rimmed object classifier" (c-classifier for rimmed object and the thumb-classifier (the copy classifier) separated and opposed to one another) is most frequently assumed to refer to a cup.

Momentarily, the unabridged representation of CUP will be presented. It superficially appears to consist of a noun plus two classifier clitics, however, these two clitics have actually climbed out of positions internal to the noun itself. Although cliticized to the noun (AT LOCØ...) at PF, there is considerable evidence that at all syntactically relevant levels, they are actually embedded within it. Their final location is the result of an obligatory rule of move-αlpha at PF which applies to all clitics of this sort because of what appears to be a purely phonetic requirement that clitics occur in initial position before a lexical item. They climb not only out of such embedded structures, but out of position internal to compounds (Kegl (1983)) and out of positions between two verbs which have been merged; i.e. SUEj, MARYi WANTi CLITICj-obj iHITj 'Mary wants to hit Sue' becomes SUEj, MARYi CLITICj-obj WANTi iHITj. Even the true case marking
clitics of the matrix verb must appear in verb initial position.
Evidence for the claim that this is move-alpha at PF comes from the
fact that they share with all other elements embedded within
lexical items an inability to play any role in the syntax of the
matrix sentence. They cannot be co-indexed with any syntactic
argument or discourse referent. Furthermore, they superficially
appear to violate a strict prohibition against more than one
classifier clitic being associated with the matrix verb. When we
view these clitics as embedded (in their pre PF-movement position)
this requirement is obeyed at every level of embedding and the
number restriction on classifier clitics is also satisfied.
Finally, although such clitics are inherently case markers,
nonetheless, they have no effect on the transitivity of the matrix
verb; nor can they condition pro-Drop or object NP-Fronting in the
matrix S—all of which are properties of true matrix clitics.
Thus, we see that in syntactically relevant structural terms, CUP
and the example given previously for MARY are equivalent. We will
use this equivalence later to justify our use of nominal glosses as
a shorthand representation when giving syntax examples where
sublexical complexity of this sort is irrelevant, and where its
inclusion is cumbersome to read and to type. Still, it is
essential to recognize that such notations are highly simplified
and are not representative of the actual formational and
morphological complexity of these signs. Although in some cases
full representations will be substituted in favor of these short
forms, such shortcuts presume a particular analysis of each sign.
For such an analysis, tests of the above mentioned sort are
essential for purposes of distinguishing syntactically irrelevant
"climbed clitics" from true matrix clitics. These distinctions play a central role in allowing us to sort out the facts concerning transitivity in ASL. (see the discussion concerning the distinction between the transitive and intransitive forms for VOTE in Chapter 5.)

Below, finally, is the full representation for the sign CUP in ASL followed by a short description of each of its parts:
3. The first clitic clearly precedes the noun. However, the ordering of the second clitic is obscured by the fact that it is a reciprocal. Thus, the c-classifier and the thumb-classifier simultaneously function as both the moving element to the verb (theme) and the located element of the ground (theme of the classifier clitic).
3.2.2 Complex Signs

Complex words contain a single theme, but two movements. Furthermore, they may have more than one locative argument marker (LOC). Two sorts of complex word schemata exist. They are distinguished by the number of LOCs they contain: Source/Goal Words (2 LOCs) and Negated Words (1 LOC).

Below are the simple word schemata discussed above with their LOCs labelled with the appropriate theta-role (source vs. goal).

<table>
<thead>
<tr>
<th>FROM-TYPE MOTION WORDS</th>
<th>TO-TYPE MOTION WORDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOC - T + M</td>
<td>M + T - LOC</td>
</tr>
<tr>
<td>![source THEME]</td>
<td>![THEME goal]</td>
</tr>
<tr>
<td>![triangle]</td>
<td>![triangle]</td>
</tr>
</tbody>
</table>

Figure 5.

Notice that in simple words, such as those mentioned above, there is a single LOC (either a source or a goal), a single terminator, a single movement and a single theme.

Complex words, on the other hand, have doubly occurring elements with some interesting co-occurrence restrictions. It is the interaction between these doubly occurring elements which provides the best insight into the internal structure of the ASL word. Schematic representations of the structures we will examine appear below:
TWO LOC COMPLEX WORD SCHEMATA: SOURCE/GOAL WORDS

[ LOC - T + M # M + T - LOC ]
\ /
(goal) \[ THEME \]
\ /
(same) [ THEME ]

e.g., 'go from a source to a goal with/by the theme'

Figure 6a.

ONE LOC COMPLEX WORD SCHEMATA: NEGATED WORDS

-----------------------

NEGATED TO-TYPE WORDS

[ M + T - LOC # M ]
\[ THEME \] \[ THEME \]

e.g., 'not go to a goal with/by a theme'

NEGATED FROM-TYPE WORDS

-----------------------

[ LOC - T + M # M ]
\[ THEME \]

'not move away from a goal with/by a theme'

Figure 6b.

3.2.2.1 Singly Occurring Elements Which Appear To Occur Twice -

The schemata above depict the surface representations of these forms. They can be a bit misleading. For example, consider the apparent contradiction between the first example in Figure 6b and the claim that complex words contain a single theme. The earlier claim still holds. The apparent presence of two themes in this
example follows from the fact that LOC intervenes between the two movements in these forms and the fact that the theme, an affix which in terms of word structure takes the rest of the word as its complement, is phonetically realized as one with the movement of a given word. The apparent dual occurrence of theme is simply an artifact of a phonological spreading rule. Clearly, we need a few more examples here to illustrate out point.

Let us digress a moment to consider a hypothetical non-ASL example involving tone. Tone in many languages can constitute an affix; yet, tone is dependent upon some vowel for its realization. Therefore, although the tonal affix may, as a result of where it is attached, have scope over the entire word stem to which it affixes, its articulation is not indicative of this. For example, let’s say a hypothetical word *tata* is a verb meaning 'to go,' *ma* is an affix meaning 'past' and High tone, (*H*), is a tonal affix meaning 'habitual.' The bracketing of the word meaning 'habitually went' appears below:

4. Hypothetical Tone Example
----------------------

```
[[[ [ tata ] ma ] H ]
 \ | | |
 \ go past habitual
 'went habitually'
```

Let us also assume that the word itself is has no inherently marked tones. High tone cannot be realized on its own; it must be associated with a vowel. Therefore, the tone is associated with the nearest vowel as follows:
TONE ASSOCIATION:

Figure 5.

Now, let's further assume that we have a language which allows spreading. Thus, the High tone associated with the [a] of [ma] spreads to the rest of the vowels in the word.

TONE SPREADING:

Figure 6.

The surface result is a word which appears to have three high tones: tätämä. A similar example involving a one syllable root [to] would have two high tones: ttmä. A three syllable root would yield a word with four high tones: tititnimä. The morpheme for habitual remains the same across these forms. However, since 1) tone must be realized on some vowel and 2) spreading is allowed; the surface realization of the H-tone affix can appear to be multiply realized. We have oversimplified the examples here by
ignoring any intervening skeletal tier (i.e., CV-tier or X-tier) which mediates between the mapping of these elements, but such detail is unnecessary for the point being made. For a detailed discussion of such processes with non-hypothetical examples see Pulleyblank (1983).

Now, let's return to ASL. The relation between the formational elements which make up the theme and the remainder of the sign is much like the relationship outlined above between a tonal affix and the word to which it attaches. The theme in the most basic examples consists solely of a classifier. [4]

Classifiers are realized by handshape. It is the affixation of a classifier to a word stem which yields the basic unit in ASL which we recognize as a word. Thus, the classifier takes the word stem as its complement, yielding a word.

---

4. Both classifiers and complete words can function as theme affixes. We will discuss only the classifier forms here. Later we will see that the tone-like behavior of classifiers (the fact they they consist only of a handshape), which forces them to be phonetically realized concurrent with the movements in a word, gets reanalyzed as a condition on head position (i.e., head initial, head final, and, in this case, head unordered; where the affix is the head). This reanalysis in terms of head position extends to the ordering of complete word themes as well. See Chapter 4.
STRUCTURAL RELATION OF CLASSIFIER AFFIX TO WORD STF:

\[ \text{X} \]
\[ \text{Classifier (word stem)} \]

Figure 7.

The actual bracketing of examples like those given previously with the "triangle notation" would be as follows:

FROM-TYPE MOTION WORDS:

[Classifier [ LOC - T + M ]]

| Theme | source |

Figure 8.

TO-TYPE MOTION WORDS

[Classifier [ M + T - LOC ]]

| Theme | goal |

Figure 9.

TWO LOC COMPLEX WORD SCHEMA

[ Classifier [ LOC - T + M [ M + T LOC ] ] ]

| Theme | Source | Goal |

Figure 10.
NEGATED TO-TYPE WORDS

[ Classifier [ [ M + T LOC ] M ]
  Theme Goal [5]

Figure 11.

NEGATED FROM-TYPE WORDS

[ Classifier [ [ LOC - T + M ] M ]
  Theme Source

Figure 12.

Classifiers, which are realized as handshapes, cannot stand alone. They must be associated with some movement. Like tones, they associate to the nearest movement and then spread to any additional movement positions in the word. Thus, in the Negated TO-type words we get the apparent occurrence of more than one theme which is actually the spreading of a single classifier to two movement positions between which a LOC intervenes.
NEGATED TO-TYPE WORDS (CLASSIFIER ASSOCIATION)

LOOKS LIKE: \[ \text{Classifier} \rightarrow \text{Classifier} \]
\[ \text{Theme Chaining} \]

Figure 13.

What above looks like the multiple occurrence of themes, in reality, can be seen to be a single classifier morpheme mapped onto
all the available movement positions in the word.

### 3.2.2.2 Actual Doubly Occurring Elements -

Having excluded the theme as a doubly occurring element, let's return to the actual cases where two LOCs, two terminators or two movements do co-occur within a single word.

#### 3.2.2.2.1 Two Argument Complex Words: (Source/Goal Words) -

The schema for two argument complex words is repeated below:

```
TWO ARGUMENT COMPLEX VERB SCHEMA:
-------------------------------
LOC - T + M & M + T - LOC
|   /    \   |
source     THEME    goal
```

Figure 14.

Except for the THEME, all the other elements of the word are doubly represented. There are, however, interesting cooccurrence restrictions on these doubly occurring elements. For example, the two LOCs must be assigned distinct theta-roles. There can't be two goals or two sources.
PROHIBITION AGAINST LIKE THETA-ROLE ASSIGNMENT:

\[
\begin{align*}
* \text{LOC} - T + M & \neq \text{LOC} - T + M \\
& \text{source} & \text{source} \\
* M + T - \text{LOC} & \neq M + T - \text{LOC} \\
& \text{goal} & \text{goal} \\
(\text{OR}) \\
* \text{LOC} - T + M & \neq M + T - \text{LOC} \\
& \text{source} & \text{THEME} & \text{source} \\
* \text{LOC} - T + M & \neq M + T - \text{LOC} \\
& \text{goal} & \text{THEME} & \text{goal}
\end{align*}
\]

Figure 15.

The above are just two possible structures which might have been possible if argument markers with like theta-roles were able to occur. Given the inherent link between FROM and the source and TO and the goal, it likewise follows that two occurrences of FROM or two occurrences of TO within a word are equally bad. Finally, it follows from our definition of complex words, that two themes are prohibited.

PROHIBITION AGAINST TWO THEMES:

\[
\begin{align*}
* \text{LOC} - T + M & \neq M + T - \text{LOC} \\
& \text{source} & \text{THEME}_1 & \text{THEME}_2 & \text{goal}
\end{align*}
\]

Figure 16.
However, let us turn our attention to the Terminators. Remember, we mentioned earlier that we might assume from the presence of locative words containing Terminators, but no Movement, that Terminators might be able to assign theta-roles. If this were so, we might expect co-occurrence restrictions against two Terminators being present within a single word (that is, assuming that all Terminators assign the theta-role "location"). Or, at the very least we might expect to see a restriction against the co-occurrence of two like terminators. Such restrictions do not exist. Combinations like the following are perfectly allowable:

ALLOWABLE THETA-ROLE COMBINATIONS:
-----------------------------

LOC - AT + M # M + AT - LOC (e.g., GIVE)

source THEME goal

LOC - WARD + M # M + WARD - LOC (e.g., DIE)

source THEME goal

Figure 17.

We have purposely avoided examples with two INs or two ONs. These examples are problematic for an independent reason. Both these Terminators make specific reference to a surface and frequently require an object clitic to co-occur with the verb. Two object clitics are not allowed with a single word. Therefore, unless the source or goal can be associated with a human body part and with the subject clitic which is a role prominence marker realized by the signer's body, such forms are usually excluded.
There are some other examples involving two INs or two ONs which are likely candidates for being considered as complex verbs with like terminators, but these are also easily analyzed as compounds which have identical themes, blended to look like a single theme by a late phonetic rule of theme chaining. As we will see later, in certain cases, single themes spread to numerous movement slots (complex words) and multiple themes blended by theme chaining will be visibly indistinguishable. We will not discuss these homophenous forms here, since the co-occurrence of double WARDs and double ATs sufficiently makes our case here. We will return to these ambiguous examples in detail in a later section.

What we can conclude, however, is that the co-occurrence restrictions placed on themes, movements and the thematic roles assigned to LOCs do not apply to pairs of terminators, thus making their role as theta-role assigners or assignees dubious.

3.2.2.2.2 Negated Words –

Negated Words offer several insights into ASL word structure. First, they show us that although movements and LOCs depend upon their structural relation to one another for their interpretation, they can function independently of one another. Movements appear to occur without their corresponding LOCs. We find negated words, of the sort schematized below, which contain two movements, but only a single locative argument marker. Yet, both movements get interpretations (one as FROM and the other as TO).
NEGATED TO-TYPE WORDS
---------------------

```
   /
  / \
 /   \
 M T LOC M
  \\
 TO   FROM
    (neg)
```

Figure 18.

NEGATED FROM-TYPE WORDS
------------------------

```
   \
  /   \
 /     \
 LOC T M M
    \
 FROM TO
   (neg)
```

Figure 19.

In such cases we can no longer rely on the sequence of LOC and MOVE to give us the interpretation, since the ordering of LOC with respect to the second MOVE is the same in both cases. The interpretation is still done in relational terms, however. It follows from the word internal restriction against the co-occurrence of FROM and TO, that the MOVE suffixed to the TO-type or FROM-type word stem will be the opposite of the movement it already contains.
The fact that the negation suffix is not invariant in meaning (sometimes FROM, sometimes TO; depending upon the base movement) gives us our second insight into ASL word structure. The distinction between FROM and TO can be collapsed and made to follow from independent principles. If we assume the negating suffix to be MOVE, then it will follow from a principle we will refer to as the Thematic Coherence Principle that MOVE can only be FROM when it attaches to a To-type stem, and TO when it attaches to a FROM-type stem. The Thematic Coherence Principle stipulates that two like theta-roles cannot co-occur within a single word stem. [5] If FROM and TO are not collapsed, then we have two different negating suffixes which attach to verb stems in exactly the same fashion.

NEGATIVE SUFFIX ATTACHMENT WITH FROM AND TO:

```
Xstem      Xstem
    /
   / \  / \ 
  /   \ /   
Xstem FROM  Xstem TO
```

Figure 20.

We will still need to appeal to some notion of thematic coherence to rule out co-occurrences of the same movements.

5. For now we will not worry about the precise delineation of the domain in which this principle holds.
THEMATIC COHERENCE RESTRICTIONS ON NEGATIVE SUFFIXES:

\[
\begin{array}{cc}
\text{Xstem} & \text{Xstem} \\
\text{FROM} & \text{TO} \\
\text{...FROM...} & \text{...TO...}
\end{array}
\]

Figure 21.

Recognizing FROM and TO to be a single form, MOVE, allows us to collapse the two types of negated words into one.

COLLAPSED REPRESENTATION OF NEGATIVE SUFFIX:

\[
\text{Xstem} \\
\text{MOVE}
\]

Figure 22.

Similarly, it allows us to see the simple To-type and FROM-type words as a single form:

COLLAPSED REPRESENTATION OF MOTION WORDS:

\[
\begin{array}{c}
\text{M T LOC} \\
\text{Mirror Image}
\end{array}
\]

Figure 23.
In chapter 3, we will demonstrate that the mirror image properties of these two forms follows directly from the lexical level at which the formatives are combined. In that chapter, we argue that affixes are heads and that the position of heads is determined by lexical levels: Level 1 (head final), Level 2 (head initial), Level 3 (head unordered). The same rules of combination applying to the same formatives at Level 1 produces TO-type words and at Level 2, produces FROM-type words.

LEVEL ORDERING AND HEAD SPECIFICATION:
----------------------------------------

LEVEL 1: head final
----------

\h
M,T ===> M T

\h\h
M+T, LOC ===> M T LOC

LEVEL 2: head initial
----------

\h
M,T ===> T M

\h\h
T+M, LOC ===> LOC T M

Figure 24.

There is no need for ordering the formatives or the rules in word formation. All possible combinations occur. Unacceptable orderings and combinations are ruled out by independent factors.
restrictions concerning head position, the thematic coherence principle, etc.

The third insight that the negated words gives concerning ASL word formation is the fact that it is the theta-role assigners which must be distinct entities. A single movement, it seems, cannot assign two theta-roles, but a single LOC can receive two theta-roles. Of course, this is completely in keeping with the theta-criterion as stated in Chomsky (1981, Chapter 6). It seems, in ASL that movements assign theta-roles to their heads and that the nature of the theta-role assigned (source vs. goal) is predictable if we know the sublexical movements involved. Remember, however, that we are talking about word internal theta-role assignment. We will see later that although word internal and syntactic theta-role assignments are linked, they are not the same process.
ASSIGNMENT OF THETA-ROLE TO LOCATIVE ARGUMENT MARKER:

\[
\begin{array}{c}
\text{a.} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\end{array}
\]

\[
\begin{array}{c}
\text{b.} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\text{\hspace{1cm}} \\
\end{array}
\]

(source)

(goal)

Figure 25.

In the case of negated words, the entire verb stem above serves as the head and the negative suffix as the complement. The movement which constitutes the negative suffix assigns its theta-role to its entire complement, but it is realized on the lexical head—the LOC. Therefore, the dual assignment of theta-roles to a single LOC occurs.
DUAL ASSIGNMENT OF THETA-ROLES TO A SINGLE LOC:

\[ h / \backslash \\
/ \backslash \\
/ \backslash \\
/ \backslash \\
/ \backslash \\
\]

LOC T M M

\[ h/\ \\
/ \ \\
/\h \ \\
/\h \ \\
/\h \ \\
M \ T LOC M \]

\[ \quad \rightarrow = \text{assignment of theta-role} \]

\[ \quad \rightarrow = \text{percolation of theta-role to lexical head} \]

Figure 26.

In both cases, LOC gets a theta-role both from the movement in the simple stem and from the negation suffix. We will argue in chapter 4 that this is perfectly allowable since the LOC is simply a member of two different theta-chains. To sum up, two LOCs holding the same theta-role cannot occur, two theta role assigners cannot assign the same theta-role within a word, but nothing prohibits two different theta-assigners from assigning their two different roles to the same LOC within the same word.

Finally, the fourth insight negated words give us into word structure concerns the issue raised earlier concerning the relation between location words and TO-type movement words. We showed earlier that the interpretation of the MOVE suffix in negated words is the opposite of the interpretation of the MOVE in the base form.
INTERPRETATION OF THE NEGATIVE "MOVE" SUFFIX:

TO T LOC {FROM}  
   {^TO}

LOC T FROM {TO}  
   {^FROM}

Figure 27.

If location words and terminators are unrelated and terminators assign their own theta-roles, we would expect no co-occurrence restrictions between location verbs and FROM and TO suffixes. This, however, is not the case. Location words pattern identically with their movement counterparts, indicating the presence at some stage in the derivation of a MOVE.

COOCURRENCE RESTRICTIONS ON NEGATIVE MOVE AND LOCATION WORDS:

(TO) T LOC {FROM}  
   {^TO}  
   {^FROM}

Figure 28.
3.3 PART II: INTRODUCTION TO THE DATA—ASL VERBS

Our discussion here will conspicuously avoid reference to
category types such as noun, verb, adjective, preposition, etc.
There is a reason for this. Motion/location roots form the basis
of the entire lexicon. There is no need to distinguish stems on
the basis of category labels. The details of this category neutral
account will be presented in Chapter 4. Most of the examples we
will discuss here will be verbs, but it should be kept in mind that
the word formation processes discussed hold across the entire
lexicon. In Gee and Kegl (1982a,b), it was proposed that the
entire lexicon is built up from a basic set of motion location
verbs. Here, we amend this claim slightly, proposing instead that
this motion/location base is category neutral.

3.3.1 Simple Verbs

In this section we will introduce various structural
possibilities in ASL verbs. Again this categorization is not
limited to this class alone. In fact, the existence of classes
based on category types will eventually be challenged. We will
begin with the set of simple verbs—verbs which involve a single
locative argument marker. Later we will consider more complex
forms involving more than a single LOC.
3.3.1.1 Motion Verbs -

Possible verbs in ASL fall into two types: motion verbs and location verbs. Motion verbs contain a motion root (either TO or FROM). In location verbs this movement is reduced and focus is on the Terminator. The pair of examples below differ only on the basis of the interpretation of their roots (TO vs. FROM). The ordering difference (TO ON LOC vs LOC ON FROM) predicts the choice of interpretation. [6]

7a. VEHICLE-MOVE-ONTO-A-PLATFORM

AT LOCi # TO+ON LOCi
b-classifier 3-classifier
(flattened surface) (vehicle)

7b. VEHICLE-MOVE-OFF-A-PLATFORM

AT LOCi # LOCi ON-FROM
b-classifier 3-classifier
(flattened surface) (vehicle)

The mirror image relation between motion verbs like those in

6. The verbs in (a) and (b) above are each preceded by a classifier clitic. This clitic is part of the lexical representation of the verb. In fact, the attachment of this clitic may well be what distinguishes this lexical item, allowing it to be recognized as a verb. It gives shape information about an object positioned at the location associated with the verb. In the case of the TO-type verbs, the classifier clitic marks the goal. In FROM-type verbs, it marks the source. These clitics function in the syntax as object agreement markers. They will be discussed in detail in a later chapter, however, we will focus here only on the motion/location verbs to which they attach.
(a) and (b) will play a central role in our analysis of ASL word formation. The morpheme ON, which appears in the above words, is one of four morphemes (IN, ON, AT, WARD) which make up the set of Terminators—morphemes which indicate the relation a movement has at its beginning or endpoint. Every motion/location root co-occurs with a single terminator. This combination is illustrated below, leaving unspecified for the moment the label of the node dominating these formatives.

**COMBINATION OF ROOT AND TERMINATOR:**

```
  \  /
   \ 
  M/L Terminator       (Mirror Image)
 Root
```

*Figure 29.*

Depending upon the root involved, the order of these elements may be as indicated above, or the mirror image of this ordering. Below, we list the basic set of motion roots and the basic set of terminators.

**BASIC SET OF MOTION ROOTS AND TERMINATORS:**

```
  \  /
   \ 
 MOVE TO
  FROM
```

**TERMINATORS:**

- AT
- IN
- ON
- WARD

*Figure 30.*

- 185 -
The two sets of morphemes listed above have differing properties. For example, if we know the motion/location root we can predict the position of the terminator with respect to it, but not \textit{vice versa}. The terminator will always temporally follow a TO and will always temporally precede a FROM. We indicate this temporal sequencing by a right (follows) vs. left (precedes) linear order: \textsc{to+in}, \textsc{to+on}, \textsc{to+at}, \textsc{to+ward} vs. \textsc{in+from}, \textsc{on+from}, \textsc{at+from}, \textsc{ward+from}. Verbs exemplifying these combinations are given below. \[7\]

8. \textsc{to + in}

\[\]

\textbf{a. enter}

\[\]

\[
\begin{array}{c}
\text{at loci} \quad \# \quad \text{to + in loci} \\
\diagup \quad \diagup \\
\text{b-classifier} \quad \text{b-classifier}
\end{array}
\]

7. For purposes of representational simplicity we will be using a shorthand notation for complex classifiers from here on. The set of simple classifiers is rather small, but the rules of word formation in ASL allow a sizeable number of complex classifiers to exist. Some like the handling classifiers are the reciprocal forms of verbs which contain their own classifier clitics. Others like the "plane-classifier" or the "A-classifier" are the simultaneous realization of more than one simple classifier on a single hand. The representations for these forms uses a great deal of space and their internal complexity is not relevant to the points we are currently examining. The full representation for these complex classifiers can be found in Appendix A: COMPLEX CLASSIFIERS.

- 186 -
b. VOTE

\[
\begin{array}{c}
\text{AT LOC1} \quad \# \quad \text{TO + IN LOC1} \\
\text{o-classifier} \quad \text{g-classifier} \\
g\text{-handling CL}
\end{array}
\]

9. TO + ON

\[
\begin{array}{c}
\text{AT LOC1} \quad \# \quad \text{TO + ON LOC1} \\
b\text{-classifier} \quad A\text{-classifier}
\end{array}
\]

b. PUT-ON

\[
\begin{array}{c}
\text{AT LOC1} \quad \# \quad \text{TO + ON LOC1} \\
b\text{-classifier} \quad \text{WARD LOC} \\
\text{b\text{-handling CL down}}
\end{array}
\]

10. TO + AT

\[
\begin{array}{c}
\text{TO + AT LOC1} \\
g\text{-classifier}
\end{array}
\]

b. FLY - TO

\[
\begin{array}{c}
\text{TO + AT LOC1} \\
\text{plane-classifier}
\end{array}
\]
11. TO + WARD

----

a. TURN - TOWARD

-----

TO + WARD LOC1

\[ g\text{-classifier} \]

b. LOOK - TOWARD

-----

TO + WARD LOC1

\[ AT \text{ LOC1} \]

\[ v\text{-classifier} \text{ eyes} \]

12. IN+FROM

-----

a. QUIT

----

\[ AT \text{ LOC1} \]

\[ ^{\text{c-classifier}} \]

\[ \# \text{ LOC1 IN+FROM} \]

\[ ^{\text{h-classifier}} \]

b. ESCAPE

-----

\[ AT \text{ LOC1} \]

\[ ^{\text{g-classifier}} \]

\[ \# \text{ LOC1 IN+FROM} \]

\[ ^{\text{down}} \]

\[ ^{\text{4-CL}} \]
13. ON + FROM

---

a. JUMP - OFF

---

\[
\text{AT LOC}_1 \quad \# \quad \text{LOC}_1 \quad \text{ON + FROM}
\]

\[
\text{b-classifier} \quad v\text{-classifier (legs)}
\]

b. UNCOVER

---

\[
\text{AT LOC}_1 \quad \# \quad \text{LOC}_1 \quad \text{ON + FROM}
\]

\[
\text{s-classifier} \quad \text{b-classifier}
\]

14. AT + FROM

---

a. GO - AWAY - FROM

---

\[
\text{LOC}_1 \quad \text{AT + FROM}
\]

\[
\text{g-classifier}
\]

b. GO - AWAY - FROM - BY - VEHICLE

---

\[
\text{LOC}_1 \quad \text{AT + FROM}
\]

\[
\text{3-classifier (vehicle)}
\]

15. WARD + FROM

---

a. LOOK - AWAY - FROM

---

\[
\text{AT LOC}_1 \quad \# \quad \text{AT LOC}_j \quad \# \quad \text{LOC}_1 \quad \text{WARD + FROM}
\]

\[
\text{g-classifier} \quad \text{SBP} \quad \text{v-CL forward}
\]

\[
\text{WARD LOC eyes}
\]
b. **TURN-AWAY-FROM**

\[\text{AT LOC1} \quad \# \quad \text{LOC1 WARD-FROM} \]
\[\text{g-classifier} \quad \quad \text{g-classifier} \]

The morpheme TO is phonetically realized by movement to a location. The terminator attached to TO further specifies the relation the root has to this endpoint. The relevant endpoint follows the articulation of TO (=> X). The morpheme FROM is phonetically realized by movement away from a location. The terminator attached to FROM further specifies the relationship the root has to this beginning point. This beginning point precedes the initiation of the movement of FROM (X =>). Notice also that the LOC in the above examples always appears on the same side of the root as the terminator. The LOC is a location which serves as an anchor point for movement. This LOC can be associated with (co-indexed with) any point in the signing space. Thus there are an infinite number of possible locations with which a LOC morpheme can be associated. In the syntax and across the discourse, LOCs which are co-indexed are seen to be co-referent. Any analysis of ASL word formation must capture the like ordering behavior of terminators and LOCs.

### 3.3.1.2 Location Verbs -

Let's now turn to a discussion of purely locative verbs: BE-AT, BE-IN, BE-ORIENTED-TOWARDS. Locative verbs share in common with TO-type motion verbs the relative ordering of the terminator
and LOC. Consider the following minimal pair consisting of the motion verb given previously, the movement verb VEHICLE-MOVE-ONTO-A-PLATFORM and the location verb VEHICLE-IS-ON-A-PLATFORM. Notice that in both cases ON precedes LOCi.

16a. VEHICLE-MOVE-ONTO-A-PLATFORM

\[
\begin{array}{c}
\text{AT LOCi} \quad \# \quad \text{TO+ON LOCi} \\
\text{b-classifier} \quad 3\text{-classifier} \\
(\text{flat surface}) \quad (\text{vehicle})
\end{array}
\]

16b. VEHICLE-IS-ON-A-PLATFORM

\[
\begin{array}{c}
\text{AT LOCi} \quad \# \quad \text{ON LOCi} \\
\text{b-classifier} \quad 3\text{-classifier} \\
(\text{flat surface}) \quad (\text{vehicle})
\end{array}
\]

Notice that the only difference between the two examples is the absence of TO in example (b); a shorthand notation which we will argue indicates reduction of the movement morpheme: ON LOCi = TO+ON LOCi. There is an apparent relation between the TO-verb and its locative counterpart. The following example (c) where LOC precedes ON means "a vehicle is off of a platform" and constitutes the locative counterpart of the movement verb in (d).

16c. VEHICLE-IS-OFF-OF-A-PLATFORM

\[
\begin{array}{c}
\# \text{AT LOCi} \quad \# \quad \text{LOCi ON} \\
\text{b-classifier} \quad 3\text{-classifier} \\
(\text{flat surface}) \quad (\text{vehicle})
\end{array}
\]
The ordering similarities between movement verbs and locative verbs leads us to assume that the shared characteristics are not simply coincidental.

If we assume FROM and TO to be distinct movement morphemes, then a distinction must be made between the lexical properties of motion roots and terminators. Knowing what the root is allows us to predict the position of the terminator, but the relation is not reciprocal. Knowing what the terminator is gives us no evidence as to where the root will occur (i.e., before or after). In essence, we would have to assume that roots like TO and FROM are specified in the lexicon for the position in which their terminators and LOCs will occur. Terminators on the other hand are unspecified for the position in which they will occur, leaving them free to be suffixes in some cases and prefixes in others. If location verbs completely lacked any movement morpheme, then it would be impossible to determine the temporal position of LOC in what appear to be purely locative verbs like BE-ON, BE-AT, BE-IN or BE-ORIENTED TOWARDS; or their counterparts BE-OFF, BE-APART, BE-OUT, BE-ORIENTED-AWAY-FROM. Examples of such verbs appear below:
17. AT:

a. VEHICLE-IS-AT-A-LOCATION

\[
\text{AT LOC1} \\
\text{3-classifier (vehicle)}
\]

b. VEHICLE-IS-AWAY-FROM-A-LOCATION

\[
\text{LOC1 AT} \\
\text{3-classifier (vehicle)}
\]

18. IN:

--


\[
\text{AT LOC1} \# \text{IN LOC1} \\
\text{o-classifier (cylindrical object)} \\
\text{g-classifier (long thin object)}
\]


\[
\text{AT LOC1} \# \text{LOC1 IN} \\
\text{o-classifier (cylindrical object)} \\
\text{g-classifier (long thin object)}
\]
19. **ON:**

--

**a. TO-BE-SITTING-ON-A-LOCATION**

\[
\begin{array}{c}
\text{AT LOC1} \\
\# \text{ON LOC1}
\end{array}
\]

h-classifier
(narrow flat surface)

\[
\begin{array}{c}
\text{bent-v classifier} \\
\text{(two bent long thin objects)} \\
\text{(legs)}
\end{array}
\]


\[
\begin{array}{c}
\text{AT LOC1} \\
\# \text{LOC1 ON}
\end{array}
\]

h-classifier
(narrow flat surface)

\[
\begin{array}{c}
\text{bent-v classifier} \\
\text{(two bent long thin objects)} \\
\text{(legs)}
\end{array}
\]

20. **WARD:**

---

**a. BE-LOOKING-AT**

\[
\begin{array}{c}
\text{AT LOC1} \\
\# \text{WARD LOCj}
\end{array}
\]

SBP

\[
\begin{array}{c}
\text{(role prominence marker)} \\
\text{WARD LOC eyes} \\
\text{v-CL forward}
\end{array}
\]

**b. BE-LOOKING-AWAY-FROM**

\[
\begin{array}{c}
\text{AT LOC1} \\
\# \text{LOCj WARD}
\end{array}
\]

SBP

\[
\begin{array}{c}
\text{(role prominence marker)} \\
\text{WARD LOC eyes} \\
\text{v-CL forward}
\end{array}
\]
The question comes down to whether the terminators can stand alone as the only root in a word. From appearances, this might seem to be the case, but there are several reasons why we would want to reject such an assumption.

Terminators seem secondary in importance to the movement morphemes (TO and FROM). These apparently independent locative forms (IN, ON, AT, WARD) are acquired after their movement counterparts (Bernstein (1980), H. Clark (1973): TO+IN, TO+ON, TO+AT, TO+WARD. This is true of both ASL and spoken language acquisition. The child cognitively masters the notion "into" before "in" and "onto" before "on." Verbs involving motion are more frequent that the stative verbs and most stative verbs have a motion counterpart: MOVE-ONTO, BE-ON; MOVE-INTO, BE-IN; TURN-TOWARD, BE-ORIENTED-TOWARD, etc.

There is also phonetic evidence that Location verbs are related to their movement counterparts by a process which reduces the Movement morpheme and emphasizes or prolongs the articulation of the terminator. The signs ON, IN, AT and WARD and OFF, OUT, APART and BE-ORIENTED-AWAY-FROM require some movement in their articulation. Signers are unwilling to accept a static representation of the sign as meaning 'to be on' or 'to be in.' [9]

9. Here we will consider only the TO-type locatives, since the static representation of the FROM-type locatives is clearly distinct from its locative counterpart by virtue of the fact that this initial Terminator relation is obscured in the course of articulating the sign. Since FROM-type locatives focus upon the final state of the movement, the Terminator relation will not longer be visible at the end of the sign. The TO-type examples, on the other hand, end in what looks identical to an independent realization of their Terminators.
Imagine a videotaped presentation of a sign where any movement to or from the relevant termination point is edited out. If IN, ON, AT and WARD are pure locational roots, and any movement is just a phonetic result of the necessity of getting the hands into the approximate locative relation, we might expect signers to interpret the signs lacking any movement as unambiguously locational. Instead they find these forms to be bound affixes and state that it is impossible to decide whether they are part of a sign meaning "to move to a termination point" or "to be at a termination point." We take this to be evidence that the movement is lexically relevant and that the sign involves both a motion/location root and a terminator. We will assume the locational words to be related to the Movement words, differing only in a reduction of their movement.

The reduced movements FROM and TO must always be peripheral in the morpheme string. Statives can occur at any level of embedding, but a stative will never be found internal to a complex verb: LOC T-FROM, TO-T LOC; but LOC T-FROM-TO-T LOC, LOC T-FROM-TO-T LOC, LOC T-FROM-TO-T LOC, etc. Thus, it follows that complex verbs are always non-stative.

Consider again the following minimal pair meaning 'a vehicle moves onto a platform' and 'a vehicle is on a platform', respectively.
--------------------------------------

O+AT LOC1   #   TO+ON LOC1
---
\hspace{0.5cm} \text{b-classifier} \hspace{0.5cm} \text{3-classifier}
\hspace{0.5cm} \text{(flat surface)} \hspace{0.5cm} \text{(vehicle)}

--------------------------------------

O+AT LOC1   #   O+ON LOC1
---
\hspace{0.5cm} \text{b-classifier} \hspace{0.5cm} \text{3-classifier}
\hspace{0.5cm} \text{(flat surface)} \hspace{0.5cm} \text{(vehicle)}

We leave the null signs in the above examples for purposes of clarity. In notating such verbs, we will generally omit these null signs. A word containing a bare terminator will always be recognizable as derived from a TO+terminator form or a FROM+terminator form by the position of its LOC relative to the movement. Similarly, AT is the unmarked terminator affix. We will frequently simplify our notation by omitting the AT terminator in examples where it is recoverable. Such simplification is utilized to shorten the length of cumbersome representations. Every stem must have a motion/location root plus a terminator affix. Therefore, when we see LOC FROM or TO LOC we know these actually represent LOC AT+FROM and TO+AT LOC. This simplification fits with the minimal phonetic content of the morpheme AT as well.

Recognizing a relationship between location verbs and movement verbs also accounts for why the locative argument marker affixes to the right of (temporally follows) or left of (temporally precedes) the location verb. If the location verb is a motion verb with
focus on the Terminator, then we would predict the position of the Terminator and the LOC in location verbs to parallel the LOC and Terminator position in the non-stative motion verbs. If this were not the case, we might expect the ordering relation between the Terminator and LOC to be arbitrary or non-linearized. Furthermore, assuming the Terminators to be independent of a motion/location root like TO or FROM would necessitate two types of morphemes: 1) terminator affixes IN, ON, AT and WARD which are unspecified for how they will attach to other morphemes or for the position at which the locative argument marker will be assigned; and 2) location roots IN, ON, AT and WARD which are lexically specified for where a locative argument marker (LOC) can attach. The line preceding or following the root indicates the lexically specified position at which it takes its terminator and LOC.

LEXICALLY SPECIFIED PROPOSITIONS FOR LOC ASSIGNMENT:

\begin{tabular}{|c|c|}
\hline
MOTION/LOCATION ROOTS & TERMINATORS \\
\hline
TO \_ & IN \\
FROM & ON \\
IN \_ & AT \\
ON \_ & WARD \\
AT \_ & \\
WARD \_ & \\
\_IN & \\
\_ON & \\
\_AT & \\
\_WARD & \\
\hline
\end{tabular}

Figure 31.
We would also need to stipulate the obvious fact that a location root (IN_, ON_, AT_, WARD_, _IN, _ON, _AT, _WARD) and a terminator affix (IN, ON, AT, WARD) cannot co-occur. Furthermore, motion roots would be required to co-occur with a terminator; whereas location roots would be prevented from doing so. Clearly, a generalization is being missed.

Finally, consider the fact that the position of LOC with respect to TO or FROM fits nicely with the semantics of these motion morphemes. TO assigns the relation 'goal' to its LOC and FROM assigns the relation 'source' to its LOC. In fact, we will late argue in Chapter 4 that both FROM and TO are simply pure movement with the position of their LOC distinguishing between their two interpretations: LOC MOVE = FROM, MOVE LOC = TO. LOC preceding MOVE is interpreted as source. LOC following MOVE is interpreted as a goal. A set of independent location roots unrelated to TO-type roots which need to be lexically specified for attachment of LOC to their right or left, would cloud the relation between the position of LOC and sources versus goals. Without such a complication we could reduce the basic verb to pure movement (V = movement) and source and goal to pure temporal relation (left = before = source; right = after = goal). We will attempt to formalize the notions presented above in Chapter where we will also show that the position of the LOC follows from the lexical level at which this affix is attached. It will be argues that there is one movement morpheme (MOVE) which need not be lexically specified for where it takes its LOC. Thus, the chart given above will be reduced to the following:
3.3.1.3 Negated Verbs -

Negated verbs consist of a FROM root suffixed to a motion or location verb. Such verbs are interpreted as a negation of the verb to which FROM has attached. Two pairs of the non-negated and negated forms of motion/location verbs appear below:

22a. GO-TO
-----

TO+AT LOCI

\[ g\text{-classifier} \]

22b. NOT-GO-TO
-------

TO+AT LOCI # FROM

\[ g\text{-classifier} \]

23a. BE-AT
-----

AT LOCI

\[ g\text{-classifier} \]

23b. NOT-BE-AT
-------

AT LOCI # FROM

\[ g\text{-classifier} \]
The physical realization of the sign involves a quick reversal of movement at the end of the sign. One interesting note concerns the locative sign in (b) above. The reversal of the movement in NOT-BE-AT is very similar to the reversal of movement in NOT-GO-TO. The FROM, in other words, is not reduced in the same way as the movement is reduced in the location verb. FROM serves to negate the any TO movement, whether or not it is reduced. It treats either variant as a true movement.

The negated form of locative verbs should not be confused with simple FROM type motion verbs like those given in previous examples. They differ with respect to the ordering of terminator and LOC.
NEGATED TO-TYPE VERBS VS. FROM-TYPE MOTION VERBS:
----------------------------------------------- [10]

<table>
<thead>
<tr>
<th>Negated Verbs</th>
<th>FROM-type Motion Verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON LOC1 FROM 'to not be on'</td>
<td>LOC1 ON FROM 'to go off of'</td>
</tr>
<tr>
<td>IN LOC1 FROM 'to not be in'</td>
<td>LOC1 IN FROM 'to go out of'</td>
</tr>
<tr>
<td>AT LOC1 FROM 'to not be at'</td>
<td>LOC1 AT FROM 'to go away from'</td>
</tr>
<tr>
<td>WARD LOC1 FROM 'to not be oriented toward'</td>
<td>LOC1 WARD FROM 'to turn away from'</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>TO+ON LOC1 FROM 'to not go onto'</td>
<td></td>
</tr>
<tr>
<td>TO+IN LOC1 FROM 'to not go into'</td>
<td></td>
</tr>
<tr>
<td>TO+AT LOC1 FROM 'to not go to'</td>
<td></td>
</tr>
<tr>
<td>TO+WARD LOC1 FROM 'to not turn toward'</td>
<td></td>
</tr>
</tbody>
</table>

Figure 32.

The schematized forms listed in parallel above have no relation to one another outside of the fact that they superficially appear to share certain internal components (ie. {Terminator, LOC, FROM}). In the negated verbs above we have a fully formed TO-type verb to which a negative suffix, FROM, is attached. The negated location verbs are related to negated motion verbs in a manner parallel to their non-negated counterparts. In the examples on the right above we have the forms for the simple FROM-type motion

10. Negated From-type words are being ignored for the moment to avoid unnecessary complications.
verbs. Notice the difference in the ordering of the terminator and LOC in these two forms.

ON LOCi FROM vs. LOCi ON FROM
(negated V) (motion V)

In this chapter, we are attempting to present the data independently of any hierarchical analysis of the forms. However, for purposes of clarity and in the hopes of emphasizing the distinctions between these different forms we give the hierarchical representations we will eventually propose for these forms below. The arguments for these representations as opposed to other possibilities will appear in Chapter 4. The first two trees illustrate the similarity between TO-type and FROM-type motion verbs. The dominance relations between the formatives is the same but they are the mirror image of each other in terms of linear ordering.

STRUCTURAL SIMILARITY BETWEEN TO- AND FROM- VERBS:
-----------------------------------------------

TO-type Motion Verbs  FROM-type Motion Verbs
-----------------------  -----------------------
        ____________      ____________
         /             /         /             /
        /             /         /             /
       /             /         /             /
      TO Terminator LOCi LOCi Terminator FROM

Figure 33.

The next two trees illustrate the relation between the TO-type
motion verb and its negated form.

**TO-TYPE MOTION VERB AND ITS NEGATED FORM:**

<table>
<thead>
<tr>
<th>TO-type Motion Verbs</th>
<th>Negated TO-type Motion Verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As is readily apparent, FROM is simply attached to the right of a TO-type motion verb to negate it. The next two Figures illustrate the location forms which correspond to the above movement verbs.

**TO-TYPE LOCATION VERB AND ITS NEGATED FORM:**

<table>
<thead>
<tr>
<th>Location Verb</th>
<th>Negated Location Verb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 35.

Remember that in the above two example the location verbs are presented in a simplified form. They are actually identical to their movement counterparts except that the movement is reduced, not absent. We will not include the reduced movement since it
makes the examples more cumbersome, but remember that the two location verbs above actually have the representation below:

**UNSIMPLIFIED REPRESENTATION OF LOCATION VERBS:**

```
/\                     /\                     /\                     /\                     /\                     /\                     /\                     /\
(  \                     (  \                     (  \                     (  \                     (  \                     (  \                     (  \                     (  \
    \                     \                     \                     \                     \                     \                     \                     \                     reduced TERM LOC
    MOVE
```

Figure 36.

Thus, we see that although the FROM-type movement verb and the negated TO-type location verb appear to share the same formative units, they actually derive from very different sources.

There are interesting gaps in the set of negated verbs as we have presented it thus far. For example, there are no FROM-type verbs which are negated by FROM-suffixation (i.e., [[[LOCi ON+FROM] FROM] "to not go off of"); nor does any mirror image variant of such a form exist (i.e., [FROM [LOCi ON+FROM]] 'to not go off of'). Furthermore, as we shall see in the next section, there are no lexically negated complex verbs. ( [[[LOCi AT FROM#TO AT LOCj] FROM] or [FROM [LOCi AT+FROM#TO+AT LOCj]] 'to not go from LOCi to LOCj). Either of these verb types can, of course, be negated by co-occurrence with the negative sign, NOT, in the syntax. This sign, itself, has a FROM-type motion verb at its base. Below is the sign NOT which involves a role prominence clitic followed by a FROM type motion verb:
24. NOT

---

AT LOCi # LOCi ON FROM

\[ \triangle \]

SBP chin \[ \triangle \]

A'-classifier (permanence)

(signer's body pronoun)

role prominence to move off from the
is at location i chin with permanence

The negation of a FROM type verb like JUMP-OFF or a complex verb like GIVE would involve a phrase containing the negative element NOT plus the sign (see the examples following). [11]

11. There is also a form of negation which involves no negation sign, but rather co-occurrence of the word or phrase with a negative head shake. This head-shake is associated with NOT. It percolates to the node dominating the negative phrase and spreads to all the elements within it.
Let's compare the above grammatically acceptable forms of negation with their ungrammatical counterparts which would involve FROM-suffixation. In the examples below, we present hypothetical lexically negated forms of JUMP-OFF and GIVE. Notice that the salient property which distinguishes these ungrammatical forms from the syntactically negated forms above, and from the previously discussed acceptable negated forms of TO-type motion verbs, is the presence of two FROM roots within a single word. [12]

The (a) and (b) forms in the examples below reflect two options: (a) the FROM-suffixation case and (b) the possibility that the mirror image property of FROM type verbs would cause FROM
to be attached to the left. As can be seen, both forms are ungrammatical.

27a. NOT-JUMP-OFF (FROM Suffixed)

\[
\text{AT LOCi} \quad \text{[[LOCi ON+FROM] FROM]}
\]
\[
\text{b-classifier}
\]
\[
\text{WARD LOC}
\]
\[
\text{bent v-CL down}
\]
or

27b. NOT-JUMP-OFF (FROM Prefixed)

\[
\text{AT LOCi} \quad \text{[FROM [LOCi ON+FROM]]}
\]
\[
\text{b-classifier}
\]
\[
\text{WARD LOC}
\]
\[
\text{bent v-CL down}
\]

12. A safe test for the "domain of a word" is to find a string of formatives which takes a single incorporated element. In the examples given previously, assuming clitics to be words, counting the number of topmost triangles will give a reasonable approximation of the number of individual words. This is because the material under the triangle is actually an argument of the word stem. In fact, LOCs can be seen as arguments assigned their theta role directly the roots FROM and TO. The incorporated argument is assigned its theta-role by the entire verb stem.
28a. NOT-GIVE (FROM Suffixed)

*[[LOC1 AT+FROM # TO+AT LOCj] FROM]

b-handling CL

or

28b. NOT-GIVE (FROM prefixed)

*[[FROM [LOC1 AT+FROM # TO+AT LOCj]]

b-handling CL

Up to now we have labelled the motion root FROM and the negation root FROM identically without really questioning whether these two formatives were one in the same item or simply homophenous but unrelated forms. The prohibition against the co-occurrence of these "two" formatives offers evidence that their physical similarity is not mere coincidence. These two FORMs seem to be one in the same. Their non-co-occurrence within a single verb follows from the same principle which prohibits a verb from assigning two identical theta-roles to its syntactic arguments. In other words, word formation processes obey some version of the thematic coherence principle. [13] We never find more than a single occurrence of TO or FROM within a single word. These roots assign thematic roles to their arguments; therefore, their

13. It should, however, be noted here that the thematic relations which hold internal to a lexical item are independent of the thematic roles which that lexical item assigns to its syntactic arguments. We will focus upon this independence of lexical and syntactic theta-roles assignment at the end of Chapter 4 and throughout Chapter 5.
co-occurrence would entail the co-occurrence of two arguments with identical theta-roles.

Let us now question the role of FROM as a negating suffix. Clearly, FROM plays a central role in negation. All negative signs are built from a base involving a FROM root and the majority of negated verbs involve suffixation of FROM. There does, however, appear to be a morphological means of negating FROM-type motion verbs. This morphological process involves the suffixing of a TO root. The negation of FROM verbs by TO-suffixation and TO-verbs by FROM suffixation fits with the fact that these roots are in essence opposites of one another. Reversing the base movement of a sign negates it. Thus, FROM has no special status as a negation morpheme outside of the fact that it occurs more frequently in this context.

The set of examples we have been discussing here (negated verbs) are not frequently discussed in the ASL linguistics literature or in grammar books. To my knowledge, the only discussion of these examples, or at least an extremely similar set of examples, appears in Jones (1978) in a discussion of what he terms "unaccomplished aspect formation." The Negated verbs we have been discussing do have a reading which could be considered as unaccomplished aspect. They are used to refer to situations where one tries to achieve the positive relation (e.g., "getting into a vehicle") but for some reason doesn't. Jones lists the following four ways to form unaccomplished aspect in ASL:

UA Formation A: 'cutting the movement short'
UA Formation B: retracting the movement

UA Formation C: making a 'false start'

UA Formation D: the movement overextending its target

The cases we have been describing would fall under UA Formation B. In the examples discussed thus far "retracting the movement" involves adding a FROM movement to the end of a verb containing a TO. Jones' main example of UA Formation B involves the unaccomplished aspect form of the verb GET-OUT which he describes as follows (p. 75):

In signing GET-OUT, the dominant hand is inside the non-dominant hand which is cupped; the dominant hand moves from being inside the non-dominant hand to outside of it. To indicate unaccomplishment, the dominant hand begins to move out of the non-dominant hand, but returns to being inside the dominant hand.

The above example would be the negation of a FROM-type movement verb by TO suffixation: [[LOCi IN+FROM] TO]. [14] Up to now we have ignored the second set of possible negated verbs, Negated FROM-type verbs. These verbs parallel the Negated TO-type verbs in every respect, except that instead of suffixation of a FROM movement, these words require suffixation of a TO movement. The retraction of TO is FROM and the retraction of FROM is TO. The observation is straightforward, but unless we assume FROM and TO to be a single morpheme, MOVE, the statement of this rule can become very complicated. The following is a list of FROM-type movement verbs (a) and their negated counterparts (b):

14. Jones translates these examples as 'began to get out of X.' We would translate the form more as 'tried to get out of X, but didn't.'
29a. GET-OUT-OF-A-VEHICLE
-----------------------
\[\text{AT LOCi} \# \text{LOCi IN+FROM} \]
\[\text{c-classifier} (\text{rimmed object}) \quad \text{WARD LOC} \quad \text{bent v-CL down (legs)}\]

29b. NOT-GET-OUT-OF-A-VEHICLE
-----------------------------
\[\text{AT LOCi} \# \text{[[LOCi IN+FROM] TO]} \]
\[\text{c-classifier} (\text{rimmed object}) \quad \text{WARD LOC} \quad \text{bent V-CL down (legs)}\]

30a. JUMP-OFF
--------
\[\text{AT LOCi} \# \text{LOCi ON+FROM} \]
\[\text{b-classifier} (\text{flat surface}) \quad \text{WARD LOC} \quad \text{bent v-CL down (legs)}\]

30b. NOT-JUMP-OFF
----------
\[\text{AT LOCi} \# \text{[[LOCi ON+FROM] TO]} \]
\[\text{b-classifier} (\text{flat surface}) \quad \text{WARD LOC} \quad \text{bent v-CL down (legs)}\]
31a. DRIVE- AWAY- FROM
--------------

LOC1 AT+ FROM
3-classifier
(vehicle)

31b. NOT- DRIVE- AWAY- FROM
--------------

[[LOC1 AT+ FROM] TO]
3-classifier

32a. TURN- AWAY- FROM
--------------

AT LOC1 # LOC1 WARD+ FROM

g-classifier
(long thin obj.)
g-classifier
(long thin obj.)
(person)

32b. NOT- TURN- AWAY- FROM
--------------

AT LOC1 # [[LOC1 WARD+ FROM] TO]

g-classifier
(long thin obj.)
g-classifier
(long thin obj.)
(person)

We find again that there are no examples where the same root appears twice within the same word (i.e., [[LOC1 ON+ FROM] FROM] and [[TO+ ON LOC1] TO]). We will argue later that the ability of TO and FROM to suffix to the word follows from the fact that they are roots. The inability of Terminators to appear in this position further distinguishes them from roots. As we will see in the section on complex verbs, the ability of like terminators to
co-occur within the word also distinguishes them from TO and FROM and indicates that they are not themselves roots, nor are they theta-role assigners.

Before we move on to a discussion of complex verbs we need to make mention of those cases of morphological negation which are frequently cited in the ASL literature and how they fit with the analysis presented here. The most frequently discussed form of morphological negation has been termed "negative incorporation" (Woodward (1973 a,b,c, 1974) and Woodward (1978)) and "negative formation" (Jones (1978)). We will use the more commonly used term "negative incorporation" to refer to this process even though the formation of the negative is more akin to a linear process of compounding than to the non-linear process we have referred to as incorporation.

Negative Incorporation is not a very productive rule of ASL morphology. The number of signs to which it applies can be listed. The most commonly cited examples are NOT-KNOW, NOT-LIKE, NOT-HAVE and NOT-WANT and the negative of GOOD, NOT-GOOD (i.e., BAD). Those signs and their non-negative counterparts are given below:
33a. KNOW

---

AT LOCI # WARD LOCI

\[\begin{array}{c}
\text{SE}P \\
\text{TO+AT LOC} \\
\text{forehead}
\end{array}\]

b-classifier

33b. NOT-KNOW

-------

AT LOCI # [[WARD LOCI] FROM]

\[\begin{array}{c}
\text{SE}P \\
\text{TO+AT LOC} \\
\text{forehead}
\end{array}\]

b-classifier

34a. LIKE

---

AT LOCI # WARD LOCI

\[\begin{array}{c}
\text{SE}P \\
\text{LOCi ON+FROM} \\
\text{chest}
\end{array}\]

\[\begin{array}{c}
\text{AT LOCa} \\
\text{TO+ON LOCa [recip]} \\
g-CL/mid-CL mid-CL/g-CL
\end{array}\]

(abstract handling classifier)

34b. NOT-LIKE

-------

AT LOCI # [[WARD LOCI] FROM]

\[\begin{array}{c}
\text{SE}P \\
\text{LOCi ON+FROM} \\
\text{chest}
\end{array}\]

\[\begin{array}{c}
\text{AT LOCa} [[TO+ON LOCa] FROM] [recip] \\
g-CL/mid-CL mid-CL/g-CL
\end{array}\]

(abstract handling classifier)
35a. HAVE

\[
\text{AT LOC1} \quad \text{b-classifier (2) chest}
\]

35b. NOT-HAVE

\[
\text{AT LOC1} \quad \text{b-classifier (2) chest}
\]

36a. WANT

\[
\text{AT LOC1} \quad \text{LOCj AT FROM} \quad \text{WARD LOC chest} \quad \text{5-classifier up}
\]

36b. NOT-WANT

\[
\text{AT LOC1} \quad \text{LOCj AT FROM} \quad \text{WARD LOC chest} \quad \text{5-classifier (2) up}
\]
Woodward (1978) argues convincingly that the rule which derives the above negative forms is not a rule of ASL, but rather a rule of French Sign Language (FSL) which existed prior to the creolization of ASL. Woodward (1978:348) describes negative incorporation as follows:

Negative incorporation in both FSL and ASL involves negating a small class of verb signs by a bound outward twisting movement of the hand(s) from the place where the sign is made.

These Negative Incorporation examples are extremely restricted and are clearly exceptional. Negative Incorporation cases are not only few, but the examples that do occur exhibit an implicational pattern of variability cross-dialectally. Woodward (1974) found that Negative Incorporation with HAVE in ASL implies it will occur.
with LIKE but not vice versa. Likewise, occurrence with LIKE implies KNOW and KNOW implies GOOD. Negative Incorporation occurred with GOOD for all ASL signers. This fits with the fact that Negative Incorporation of GOOD is the lexical item BAD. Woodward and De Santis (1976) found the same implicational variation to occur in FSL with one exception: No French signer ever used Negative Incorporation with GOOD. They presented evidence that Negative Incorporation began in FSL prior to 1816 arguing that it was a phonological assimilation between the signs KNOW, WANT, LIKE and HAVE and a following FSL sign for NOT. When FSL creolized with existing varieties of sign language already in America, Negative Incorporation was reanalyzed as a grammatical process affecting the same four verbs and later the sign GOOD in ASL. Below we quote Woodward's (1978:344) account of this process in FSL.

Negative Incorporation is a phonological process in FSL. Word order in old and modern FSL is Verb+NOT. FSL NOT is produced in neutral space in front of the body with a "G" handshape (index finger extended from the fist). The index finger points upward and the palm is outward from the body. The "G" hand moves repeatedly from side to side. In Negative Incorporation, FSL NOT assimilates location and handshape to that of the preceding verb sign and loses its movement. This results in an outward twisting movement (to obtain the outward orientation of FSL NOT) from the place where the verb sign is made. Thus these negated signs have
the same phonological structure in FSL and ASL. However, assimilation adequately describes the process of Negative Incorporation in FSL but not in ASL.

The actual FSL assimilation rule could not have been borrowed in ASL since the sign for NOT in ASL (see Woodward (1978)) is not even a cognate of FSL NOT. Furthermore, its ordering is different. These Negative Incorporation cases do, however, bear a resemblance to the FROM-suffixation which occurs with (TO)+WARD-TYPE verbs. These signs could have been reanalyzed as FROM-suffixation cases on the basis of their physical similarity (compare a sign like NOT-BE-ORIENTED-TOWARD and DON'T-KNOW).

Even though the Negative Incorporation cases can be treated as negated verbs, they still stand out as lexical exceptions. Except for these cases, negated verbs are literal motion/location verbs. Morphological negation does not seem to apply to metaphorically extended cases. Furthermore, Negative Incorporation of these five verbs does not seem to have extended to other verb forms. There is evidence of overgeneralization from child language acquisition data and second language acquisition data. Examples like NOT-THINK and NOT-LOVE are cited, but they are seen as ungrammatical.

38. NOT-THINK

\[
\begin{array}{c}
\text{AT LOC1} \\
\text{SBP} \\
g\text{-classifier}
\end{array}
\quad\#
\quad\left[ \text{WARD LOC1} \right] \text{FROM}
\quad\text{AT LOC forehead}
\]

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These are similar to overgeneralizations like bring brang brung on analogy with sing sang sung. They indicate that at some point signer's assume there to be a rule relating these cases. Notice that the overgeneralizations remain within the classes of emotion (LOVE, LIKE) and cognition (THINK, KNOW). Furthermore, the overgeneralization recognizes the shared feature all the Negative Incorporation examples share. They are all body anchor signs. They must be made on or in relation to the signer's body. Despite the tendency to overgeneralize, signer's quickly learn that the Negative Incorporation cases are lexical exceptions.

Thus we conclude that the negated verbs mentioned earlier are formed by a productive word formation process, while the more commonly cited Negative Incorporation cases constitute a class of reanalyzed lexical exceptions borrowed directly from FSL. There is a rule, but it is highly restricted and much like the behavior of Level 1 latinate affixes in English (con, per, re, etc.) is highly lexicalized and restricted to FSL-forms.
3.3.2 Complex Verbs

Thus far we have considered primarily words with a single locative argument (source, goal or location). There also exist complex verbs which have two locative argument markers. At first glance, these verbs appear to be concatenations of two simple verbs. Consider the prototypical example, the verb GIVE:

40. GIVE:

   ______
  |     |
  | chest |
  | WARD LOC | chest
  |     |
  | b-handling CL up |

The notation we use above leaves ambiguous any hierarchical representation of the verb. For example, two possible hierarchical representations are given in (a) and (b) below.

CONCATENATED STRUCTURE:

                        ____________
                      /                |
                     /                |
                    /                |
                   /                |
                  /                |
                 /                |
                /                |
               /                |
              /                |
             /                |
            /                |
           /                |
          /                |
         /                |
        /                |
       /                |
      /                |
     /                |
    /                |
   /                |
  /                |
 LOC1 AT FROM TO AT LOCj

Figure 37.
RIGHT BRANCHING STRUCTURE:
----------------------

\[ \text{LOCi AT FROM TO AT LOCj} \]

Figure 38.

The above are only two of a myriad of possible hierarchical representations of these verbs. We will narrow down the possibilities and in fact argue for (b) as the correct representation later in Chapter 4. For now, let us remain neutral and simply point out some interesting properties of complex verbs. A representative list of complex verbs appears below:

41. GIVE (with optional clitic)
-----------------------------
\[ \text{AT LOCi} \quad \# \quad \text{LOCi WARD+FROM+TO+WARD LOCj} \]
\[ \quad \text{g-CL} \]
\[ \quad \text{chest} \quad \text{WARD LOC} \quad \text{chest} \]
\[ \quad \text{b-handling CL up} \]

42. MOVE-FROM-X-TO-Y
----------------------
\[ \text{LOCi AT+FROM+TO+AT LOCj} \]
\[ \quad \text{WARD LOC} \]
\[ \quad \text{b-handling CL down} \]
43. FLY-FROM-X-TO-Y
-----------
LOC1 AT+FROM TO+AT LOCj
       plane-CL

44. TELL
------
AT LOC1 # LOC1 WARD+FROM TO+WARD LOCj
       SBP mouth g-classifier
(signer's body (long thin object)
   pronoun)

45. LEARN
------
AT LOCj # AT LOCj # LOCj ON+FROM TO+AT LOCj
   b-classifier SBP WARD LOC forehead
   (flat surface (signer's
   body pro.) AT LOCa TO+ON LOC down
   b-CL/ th-CL
   th-CL/b-CL
   (motion variant of
   b-handling CL)

Close examination of the set of possible complex verbs quickly reveals that such verbs are not simply the combination of any pair of simple verbs. There are too many systematic gaps.

3.3.2.1 Combinations Excluded By The Thematic Coherence Principle

The first narrowing down of the set of possible complex verbs seems to follow from some version of the Thematic Coherence Principle. Thematic Relations, the Theta-Criterion and the
Thematic Coherence Principle are discussed in detail in Chapter 5. Here let us merely point out that the Thematic Coherence Principle plays a role not only in the syntax but in word formation as well. Furthermore, the thematic arguments internal to a sign need not correspond to syntactic thematic arguments. The sign works much like an idiom -- reflecting an internal syntactic structure but not necessarily a structure which has any implication for the syntactic arguments such a word will subcategorize for. (see discussion of VOTE in Chapter 5.) This discussion will address only word internal thematic arguments.

Movement morphemes assign a thematic role to the locative argument marker (LOC) which is associated with them. FROM assigns the role source to its LOC, whereas TO assigns the role goal. There is a third thematic role, theme, which is assigned to the element (classifier, noun or gerund; i.e. some X) which is incorporated into the movement of the sign. Every word must have a theme argument and at least one locative argument (source, goal or location). A given thematic role can be assigned to one and only one argument within a word. This domain can be stated in terms of maximal projections if we recognize X as the maximal projection of a lexical category (i.e., "'X'...X = minX...maxX). [15] We will argue for such an interpretation in Chapter 4. The descriptive point is that X's embedded within X's can have arguments which are assigned like thematic roles by different roots, but two like roles may not be assigned to two different arguments in the non-embedding

15. Bars to the left of a category marker (e.g., "'X)") indicate negative bar levels--X-bar structures internal to lexical items.
case. A configuration like the one in Figure (a) is possible, as the following example demonstrates, but a configuration like the one in Figure (b) is ruled out.

WORD WITH TWO LIKE THETA-ROLES IN DIFFERENT THEMES:

\[ \text{Figure 39a.} \]

46. ACCEPT

\[ \text{Figure 39b.} \]

\[ - 225 - \]
3.3.2.2 Exclusion Of Locatives As Members Of The Set Of Complex Verbs -

The set of possible complex verbs is further limited to combinations of only motion forms. There are no complex verbs consisting of FROM plus ON or AT and TO. Even when statives are associated with the thematically appropriate reduced movement form, the combination is still prohibited. The following motion/location pairs are possible with simple verbs:

Motion/Location Pair
-----------------------

47a. BIRD-LANDS-ON-A-BRANCH
-----------------------

```
AT LOCi    # TO-ON LOCi
g-classifier    bent V-classifier
```

47b. BIRD-IS-ON-A-BRANCH
-----------------------

```
AT LOCi    # ON LOCi
g-classifier    bent V-classifier
```

16. This example is a little misleading since structures of the above sort do appear in ASL, but only as the result of number agreement applied to a verb with a single goal LOC. Such cases would be comparable to the thematic structure in "Mary gave the book to John and Sue", whereas the structure in Figure (b) above is more comparable to "Mary gave the book to John to Sue."
Negated Motion/Location Pair
--------------------------

48a. BIRD-DOESN'T-LAND-ON-A-BRANCH
--------------------------

AT LOCI  #  TO+ON LOCI#FROM
  g-classifier  bent V-classifier

48b. BIRD-ISN'T-ON-A-BRANCH
--------------------------

AT LOCI  #  ON LOCi#FROM
  g-classifier  bent V-classifier

No such pairs exist for complex verbs. It is hard to imagine what the locative version of a complex verb like GIVE could mean.

49. GIVE (hypothetical locative version)
--------------------------

#LOCI AT+FROM#+ON LOCj

WARD LOC  "?possession moves from LOCi and is at LOCj"

b-handling CL

Notice that the co-occurrence restriction against the combination of a movement morpheme and a stative verb holds only for complex verbs. As can be seen, such combination are perfectly acceptable in the examples of Negated Verbs.
The positions where reduced movements can and cannot occur reveal information about the nature of these morphemes. There is a productive alternation between non-stative and stative non-complex verbs. Movement reduced morphemes only occur in peripheral positions in the morpheme string. Negative suffix attachment and cliticization can attach material to a reduced movement, making it no longer peripheral. This is some evidence that these processes apply later, after the periphery restriction is no longer relevant. Complex verbs never contain statives and can never be negated with a negative suffix. The Thematic Coherence Principle is inviolable in all forms of statives, non-statives, complex verbs and negated verbs. Thematic Coherence will prove to be a reliable test for word-hood which can distinguish compounds from simple and complex words. However, the restriction against combinations of statives and non-statives holds only for complex verbs; whereas Negated verbs allow a wider range of combinations.

If we view the reduced stative verbs as secondary to non-stative forms, perhaps morphologically marked to undergo reduction, but needing to be in a peripheral position for the rule to apply, and recognize that complex verbs are formed prior to the application of this rule; then, it will always be the case that complex verb formation will destroy the structural description to which movement reduction can apply. With such a story we can account for both the non-existence of statives inside complex verbs and the peripherality of reduced movements. Negative suffix attachment and cliticization, then, would be seen as applying after movement reduction. The non-occurrence of statives with the
thematic role associated with their reduced movement; the fact that locatives appear only in a subset of the environments in which their motion counterparts occur; and the close semantic relation between motion and location minimal pairs all argue for the secondary nature of location signs.

3.3.2.3 Restriction Of Complex Verbs To Combination Of FROM And TO-

In reviewing our discussion thus far, we find that complex verbs are actually restricted to combinations involving FROM and TO. From this it also follows that there is no morphologically negated version of any complex motion verb. Since complex verbs contain both a TO and FROM root, the suffixation of either of these two roots to form a negative is prohibited by the Thematic Coherence Principle. Thus, complex verbs must be syntactically negated.

If we consider the potential combinations of FROM and TO with the four terminators (IN, ON, AT and WARD), the number of possible complex verbs is still sizeable. It should be noted here, however, that although all possible co-occurrences of terminators within complex verbs seem to occur, forms with two neutral terminators (ATs) seem to be most frequent. Almost all the complex signs involving non-neutral terminators are reanalyzed compounds. The scarcity of non-neutral terminators (IN, ON) also seems to be tied to the fact that non-neutral terminators generally co-occur with clitics. There are restrictions on the number of classifier and role prominence clitics which can co-occur. Only one role
prominence clitic and one classifier clitic may occur with a single word; where the matrix string and each embedded string are all seen as independent words. In other words, embedded themes are an instance of recursion at the word level. Independently of restrictions on exactly when certain combinations can occur, the list below includes all the potential combinations.

**COOCCURRENCE OF TERMINATORS IN COMPLEX VERBS:**

<table>
<thead>
<tr>
<th>LOC1 AT+FROM # TO+AT LOCj</th>
<th>LOC1 IN+FROM # TO+AT LOCj</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOC1 AT+FROM # TO+IN LOCj</td>
<td>LOC1 IN+FROM # TO+IN LOCj</td>
</tr>
<tr>
<td>LOC1 AT+FROM # TO+ON LOCj</td>
<td>LOC1 IN+FROM # TO+ON LOCj</td>
</tr>
<tr>
<td>LOC1 AT+FROM # TO+WARD LOCj</td>
<td>LOC1 IN+FROM # TO+WARD LOCj</td>
</tr>
<tr>
<td>LOC1 ON+FROM # TO+AT LOCj</td>
<td>LOC1 WARD+FROM # TO+AT LOCj</td>
</tr>
<tr>
<td>LOC1 ON+FROM # TO+IN LOCj</td>
<td>LOC1 WARD+FROM # TO+IN LOCj</td>
</tr>
<tr>
<td>LOC1 ON+FROM # TO+ON LOCj</td>
<td>LOC1 WARD+FROM # TO+ON LOCj</td>
</tr>
<tr>
<td>LOC1 ON+FROM # TO+WARD LOCj</td>
<td>LOC1 WARD+FROM # TO+WARD LOCj</td>
</tr>
</tbody>
</table>

**FIGURE 40.**

Notice that the existence of examples like those in boxes above highlight the distinction between terminators and roots since two identical terminators can appear within a single word. Thus, we can conclude that terminators are not theta-role assigners and, therefore, their co-occurrence does not violate the Thematic Coherence Principle. The verb GIVE is such an example. Additional examples appear below:
50. GO-FROM-X-TO-Y-BY-VEHICLE

\[ \text{LOC}_i \text{ AT+FROM } \# \text{ TO+AT } \text{ LOC}_j \]
3-classifier (vehicle)

51. DIE

\[ \text{AT } \text{ LOC}_i \# \text{ AT } \text{ LOC}_j \]

SBP \[ \text{LOC WARD+FROM } \# \text{ TO+WARD } \text{ LOC} \]
\[ \text{down/up} \text{ b-classifiers} \]
\[ \text{up/down} \text{ (2 handed)} \]

Examples like GIVE, MOVE-FROM-X-TO-Y, FLY-FROM-X-TO-Y, TELL and LEARN all constitute complex verbs. We can divide these examples into three distinct groups. First, GIVE is unquestionably a single lexical item where the source is closely tied with an animate agent and the goal with an animate being as well. It has no corresponding compound form or two verb sequence.

52. *GIVE (compound)

\[ \text{*[[LOC}_i \text{ AT+FROM}] \# \text{ [TO+AT LOC}_j]] \]

WARD LOC \[ \text{b-handling CL} \text{ up} \text{ b-handling CL} \text{ up} \]

'to give from location \[ \text{i} \] and to location \[ \text{j} \]'

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Second, MOVE-FROM-X-TO-Y and FLY-FROM-X-TO-Y are two argument verbs (source and goal) whose arguments are locations or inanimate objects located at particular positions. These verbs are difficult to distinguish from compounds, but we will provide some evidence later concerning their focus on the path of movement rather than the individual acts of moving from one location and moving to another that leads us to consider them to be complex verbs. Although individual single argument verbs like FLY-FROM-X or FLY-TO-Y can occur, sequences of such verbs except in very emphatic cases are rejected in favor of expression as a complex verb. Finally, verbs like TELL and LEARN behave like single lexical items, but their origin is clearly a compounding of two individual words which are reanalyzed as a complex word. In compounds, the original sequence of verbs did not explicitly involve movement from a source to a goal. They are reanalyzed as involving a path. For example, LEARN is a compound of the following two words:
54. TAKE-SOMETHING-OFF-OF-A-FLAT-SURFACE

\[
\begin{array}{c}
\text{AT LOCi} \quad \# \quad \text{LOCi ON+FROM} \\
\text{WARD LOC} \\
\text{b-CL up} \\
\text{At LOCa TO+ON LOCa} \\
\text{b-CL/th-CL th-CL/b-CL} \\
\end{array}
\]

\[b\text{-handling} \quad | \quad \text{classifier} \quad | \quad \text{(motion} \quad | \quad \text{variant)}
\]

\[
\begin{array}{c}
a \text{flat surface} \\
\text{something is taken} \\
is \text{at location} \\
o \text{ff of what is at} \\
i \text{location by a hand} \\
i
\end{array}
\]

'to take information from a page'

55. PUT-INTO-ONE'S-HEAD

\[
\begin{array}{c}
\text{TO+ON LOCi} \\
\text{forehead} \\
\text{ON LOC} \\
\text{AT LOCa ON LOCa} \\
\text{b-CL/th-CL th-CL/b-CL}
\end{array}
\]

\[b\text{-handling} \quad | \quad \text{classifier} \quad | \quad \text{(location} \quad | \quad \text{variant)}
\]

'something is put on/in the head by a hand' [17]

The two words given above actually involve two different, but related, themes (where theme is the X embedded within the movement of a higher sign). The first word (LOCi ON+FROM) contains the motion word, TO+ON LOC. The second word contains the corresponding location word, ON LOC. The first refers to the act of grasping an object (i.e., two opposed flat surfaces come in contact with an object). The second refers to the final state of holding an object.

17. The involvement of hands in the LEARN example are not to be taken literally, but rather, handling indicates intentionality on the part of some agent.
between the thumb and fingers (i.e., two opposed flat surfaces are in contact with an object). A change in the articulation of this sequence of themes gives us evidence that the sign has gone beyond the simple compounding of two words and has been reanalyzed as a complex verb with a single incorporated theme.

56. LEARN

\[
\text{AT LOCj} \# \text{AT LOCi} \# \text{LOCj ON+FROM} \# \text{TO+ON LOCi} \]
\[
\text{WARD LOC} \quad \text{SBP} \quad \text{AT LOCa} \quad \text{TO+ON LOCa forehead}
\]
\[
\text{b-CL up body} \quad \text{b-CL/th-CL th-CL/b-CL pronoun}
\]

The reanalyzed sign LEARN involves a single incorporated motion verb (TO+ON LOC) which reaches its final point of contact at the same time the main movement of the verb (TO+ON LOCi) reaches its final goal, the forehead. The compounded sequence of words TAKE-SOMETHING-OFF-A-FLAT-SURFACE and PUT-INTO-ONE'S-HEAD would be articulated very differently. The incorporated motion verb (TO+ON LOC) would reach its final point of contact (fingers and thumb contacting) concurrent with the end of the first sign TAKE, (LOCj ON+FROM), and the location verb (ON LOC) would be signed throughout the second portion of the compound PUT, (TO+ON LOCi).

3.3.2.4 Distinguishing Compound From Complex Words -

The difference in physical articulation between the compound and the complex verb form is schematized below, where '---' equals movement and 'X' equals being in contact.
PHYSICAL ARTICULATION OF COMPOUND VS. COMPLEX VERB:

compound word: | LOC1 ON+FROM | TO+ON LOCj |
----------------->XXXXXXXXXXX

complex word: | LOC1 ON+FROM # TO+ON LOCj |
------------------------->X

Figure 41.

The distinction between a compound and a complex verb is an important one, for several reasons. Although a compound behaves in many respects as a single lexical unit (acts as a single domain for purposes of stem assignment, acts as a single word for purposes of determining word initial clitic positions), it still allows its component words to retain their individual incorporated themes. A complex word behaves as a single lexical item in all respects, including the fact that it allows only a single incorporated theme. Earlier we pointed out that the lexical domain within which the Thematic Coherence Principle holds is that string of morphemes with which a single incorporated theme is associated. Thus, a complex word must obey the Thematic Coherence Principle (it cannot contain more than one source, goal or theme), whereas a compound is exempt from such a restriction -- except internal to the individual words which comprise it.
We will begin our contrast and comparison of complex verbs and compounds by focussing upon characteristics which both types share. Compounds obey only a subset of the restrictions which apply to complex verbs. Therefore, it follows that a discussion of the restrictions which apply to compounds will highlight those restrictions which the two types share.

3.3.2.4.1 Characteristics Of Compounds -

Consider a sign like DISCUSS which is a compound, but not a complex word. Two signs comprise this compound. The first sign, LONG-THIN-OBJECT-AT-ONE'S-MOUTH, (see (a) below), is a marker of the locution class. It appears as the initial member of many signs in the class of verbs associated with speaking:

57. DISCUSS (X+LONG-THIN-OBJECT-MOVES-ONTOS-A-FLAT-SURFACE)
58. EXPLAIN (X+HANDLED-LONG-THIN-OBJECT-MOVES-TO-A-LOCATION)
59. ANNOUNCE (X+LONG-THIN-OBJECT-ORIENTS-OUTWARD)
60. PROVE (X+MANY-LINES-MOVE-ONTOS-A-FLAT-SURFACE)
61. DEBATE (reciprocal form of DISCUSS)
62. ARGUE (X+LONG-THIN-OBJECTS-OPPOSE-EACH-OTHER)

etc.

(X = the locution class marker.)

The second member of DISCUSS is the motion sign, LONG-THIN-OBJECT-MOVES-ONTOS-A-FLAT-SURFACE, (see (b) below). This sign is reduplicated for continuous aspect.
63a. FIRST MEMBER OF THE COMPOUND DISCUSS:

LONG-THIN-OBJECT-TO-ONE'S-MOUTH

\[
\begin{array}{c}
\text{AT LOCi} \quad \text{WARD LOCi} \\
\text{SBP} \quad \text{AT LOC} \\
\text{g-classifier} \\
\text{mouth}
\end{array}
\]

'point to the mouth with a long thin object'

63b. SECOND MEMBER OF THE COMPOUND DISCUSS:

LONG-THIN-OBJECT-MOVES-ONTO-A-FLAT-SURFACE [18]

\[
\begin{array}{c}
\text{AT LOCj} \quad \text{[TO+ON LOCj [reduplicated]]} \\
\text{b-classifier} \quad \text{g-classifier} \\
\text{(long thin object)}
\end{array}
\]

3.3.2.4.1.1 Clitic Movement -

Let us first consider the evidence that DISCUSS is a compound and not just a sequence of two lexical items. The first piece of evidence concerns movement of the clitic associated with the second word in the compound to the initial position of the entire compound. The simple concatenation of the two words compounded in DISCUSS appears below. The clitics are indicated.

18. This sign used in conjunction with the locution class marker is difficult to assign a meaning to. In essence, it can be related to the metaphorically extended meaning of English idioms like 'to lay out the facts; to lay one's cards on the table, etc.'
In the actual surface form of DISCUSS the classifier clitic in the second word is moved to word initial position. There is a general condition in ASL which requires all clitics to be word initial. The process by which the clitic moves we will later argue occurs at PF (phonetic form). There are a variety of processes which result in word internal clitics: compounding, X' incorporation, merger. In all such cases clitic movement occurs. The PF representation of DISCUSS appears below:

We take clitic movement to be evidence that to some degree the two parts of the compound function as a single lexical item thereby rendering an ungrammatical form at PF in which a clitic is internal
to a lexical item. This ungrammaticality is resolved by fronting of the clitic to word initial position at PF.

The restriction which leads to clitic movement in compounds holds for complex verbs as well. However, we do not see evidence in these forms of clitic movement. The situation never arises where a clitic, even prior to PF, could be internal to a complex verb.

3.3.2.4.1.2 Conditions Of The Co-occurrence Of Clitics With Verbs

Both complex verbs and compounds, as we have just seen, can co-occur with at most one classifier clitic. Furthermore, this clitic must be co-indexed with one of the locative argument markers on the verb. It cannot be co-indexed with the theme argument. The following two examples illustrate this point. In the first example, STEAL-FROM-OUT-OF-A-RIMMED-OBJECT, the classifier clitic corresponds to the source. In the second example, STEAL-A-RIMMED-OBJECT, the classifier clitic corresponds to the theme even though its initial location is at the source of the movement.

19. The ordering of the clitics is an interesting problem. If ASL requires that clitics be word initial, then the ordering of more than one clitic becomes a potential paradox. ASL solves this problem by partial ordering. Clitics are ordered with respect to the word, but not with respect to each other.
Compounds and complex verbs share the property of allowing at most one classifier clitic, but they put restrictions upon the locative argument with which this clitic may agree. In compounds, there can be one and only one classifier clitic for the word as a whole. This clitic can correspond to either the source or the goal. The examples below illustrate this point. The first two examples are the individual words which comprise the compound. The second two examples are compounds; the first with a goal clitic and the second with a source clitic. The verb in question, JUMP-OFF-OF-A-FLAT-SURFACEi -- JUMP-ONTO-A-FLAT-SURFACEj, could appear in a context meaning 'to jump off of a table onto the floor.'
68. JUMP-OFF-OF-A-FLAT-SURFACEi

\[
\begin{array}{l}
\text{AT LOCi} \quad \# \quad \text{LOCi ON+FROM} \\
\quad \text{\ \\
\quad b-classifier} \quad (\text{flat surface}) \\
\quad \text{WARD LOC} \\
\quad \quad \downarrow \\
\quad \quad \text{v-CL down} \\
\quad (\text{legs})
\end{array}
\]

69. JUMP-ONTO-A-FLAT-SURFACEj

\[
\begin{array}{l}
\text{AT LOCj} \quad \# \quad \text{TO+ON LOCj} \\
\quad \text{\ \\
\quad b-classifier} \\
\quad \text{WARD LOC} \\
\quad \quad \downarrow \\
\quad \quad \text{v-CL down} \\
\quad (\text{legs})
\end{array}
\]

70. JUMP-OFF-OF-LOCATIONi--JUMP-ONTO-A-FLAT-SURFACEj

\[
\begin{array}{l}
\text{AT LOCj} \quad \# \quad [\text{LOCi ON+FROM} \# \text{TO+ON LOCj}] \\
\quad \text{\ \\
\quad b-classifier} \\
\quad \text{WARD LOC} \\
\quad \quad \downarrow \\
\quad \quad \text{v-CL down} \\
\quad (\text{legs}) \\
\quad \text{WARD LOC} \\
\quad \quad \downarrow \\
\quad \quad \text{v-CL down} \\
\quad (\text{legs}) \\
\quad \quad \downarrow \\
\quad \quad \text{theme chaining!} \\
\quad \text{(goal)}
\end{array}
\]

Note: We know this is a compound because the goal clitic precedes the source.


\[
\begin{array}{l}
\text{AT LOCj} \quad \# \quad [\text{LOCi ON+FROM} \# \text{TO+ON LOCj}] \\
\quad \text{\ \\
\quad b-classifier} \\
\quad \text{WARD LOC} \\
\quad \quad \downarrow \\
\quad \quad \text{v-CL down} \\
\quad (\text{legs}) \\
\quad \text{WARD LOC} \\
\quad \quad \downarrow \\
\quad \quad \text{v-CL down} \\
\quad (\text{legs}) \\
\quad \quad \downarrow \\
\quad \quad \text{theme chaining!} \\
\quad \text{(source)}
\end{array}
\]
Now let us consider a parallel set of examples involving a complex verb. The verb we will use would occur in a sentence meaning 'Someone walked from the house to the car.' Since the classifiers used here differ we will also consider an example where the source and the goal are interchanged: 'Someone walked from the car to the house.' We will assume the actual N's CAR and HOUSE to have been set up previously in the sentence or discourse.

72. WALK-AWAY-FROM-A-VEHICLE

AT LOC1 ̸ LOC1 AT-FROM
3-classifier (vehicle) WARD LOC

v-CL down
(legs)

'e.g., walk away from a car'

73. WALK-TO-A-VERTICAL-FLAT-SURFACE

AT LOCj ̸ TO-AT LOCj
WARD LOC

v-CL down
(legs)

WARD LOC

b-CL side
(verticai surface)

'e.g., walk to a house'
74. WALK-AWAY-FROM-LOCATION-i-TO-FLAT-SURFACE-AT-LOCATION-j

AT LOCj  # [LOCi AT+FROM # TO+AT LOCj

WARD LOC

b-CL  side
(vertical surface)

v-CL  down
(legs)

(goal)

'e.g., walk from a car to a house'

75. WALK-AWAY-FROM-VEHICLE-AT-LOCATION-i-TO LOCATION-j

#AT LOCi  # [LOCi AT+FROM # TO+AT LOCj]

3-classifier
(vehicle)

WARD LOC

v-CL  down
(legs)

(source)

'e.g., walk from a car to a house'

76. WALK-AWAY-FROM-A-VERTICAL-FLAT-SURFACE

AT LOCi  # LOCi AT+FROM

WARD LOC

b-CL  side
(vertical surface)

v-CL  down
(legs)

(source)

'e.g., walk away from a house'
77. WALK-TO-A-VEHICLE

\[ \text{AT LOCj} \# \text{TO+AT LOCj} \]

3-classifier (vehicle) WARD LOC
\[ \text{v-CL down} \] (legs)

(goal)

'e.g., walk to a car'

78. WALK-AWAY-FROM-LOCATIONi-TO-A-VEHICLE-AT-LOCATIONj

\[ \text{AT LOCj} \# [\text{LOCi AT+FROM} \# \text{TO+AT LOCj}] \]

3-classifier (vertical flat surface) WARD LOC
\[ \text{v-CL down} \] (legs)

(goal)

'e.g., to walk from location-i to a car'

79. WALK-AWAY-FROM-A-VERTICAL-FLAT-SURFACEi-TO LOCATIONj

\[ \# \text{AT LOCi} \# [\text{LOCi AT+FROM} \# \text{TO+AT LOCj}] \]

WARD LOC WARD LOC
\[ \text{b-CL side} \] \[ \text{v-CL down} \] (vertical flat surface) (legs)

(source)

'e.g., to walk from a house to location-j'

Notice in the above examples that if only a single locative argument co-occurs with the verb, it may have a corresponding non-theme classifier clitic. However, if two locative arguments
occur and both could equally well be associated with classifier clitics, the goal will win out over the source.

The generalization here cannot be easily stated in terms of sources, goals and themes. Rather, it requires reference to an independent hierarchy in which these relations are ranked. This hierarchy is arranged from most groundlike to least groundlike where by ground we refer to something which serves as a background to movement. Figure can be thought of as equivalent to theme. It is the moving element. Source and goal can both be considered grounds but they are ranked with respect to one another, and goal is more of a ground than source is.

GROUND HIERARCHY:

```
          +
         /
  goal   source  ground
         /
        /
  theme
```

Figure 42.

The classifier clitic marks the ground. When a choice must be made the argument with a role higher on the hierarchy wins out. Since all verbs have a theme and at least one locative argument (source or goal), theme is destined never to win. We will address figure/ground relations in more detail in Chapter 5.
3.3.2.4.1.3 Stress Assignment -

Let us return again to the example DISCUSS noting that the characteristics we discuss apply to all compounds. Stress assignment provides a third piece of evidence that the two words in DISCUSS actually form a compound.

In ASL the following facts hold concerning stress. First, clitics are unstressable, perhaps accounting in part for their obligatory movement to word initial position. Pronouns are unstressed but stressable. Finally, other words receive stress. [20] A sequence of two words will each receive primary stress. However, when these two words form a compound, only the final member receives primary stress. This is the case with the word DISCUSS.

20. For the details of stress assignment in ASL see Kegl (1983). Only the fact that a particular word receives or does not receive primary stress will be relevant to our discussion here.
80. DISCUSS

--

Complex verbs being formed as single lexical items or reanalyzed as such from already compounded forms will automatically have the correct stress assignment.

3.3.2.4.2 Characteristics Of Complex Verbs -

Now let us turn to the subset of characteristics unique only to complex verbs. Remember that these verbs have all the characteristics attributed to compounds as well. We have presented evidence that words like DISCUSS are not merely sequences of two words, but are compounds. Now let us consider evidence that distinguishes these compounds from complex words.
The first piece of evidence that DISCUSS is not a complex word concerns the co-occurrence within the compound of WARD LOCi and TO+ON LOCj. We argued earlier that WARD LOCi is closely related to TO+WARD LOCi, differing only in the reduction of its movement. Since it is the root TO, and not the terminator, which assigns the thematic role to the locative argument marker, LOCi and LOCj are assigned the same theta-role (goal). A non-compound word cannot have the same theta-role assigned to more than one of its arguments.

The domain in which the Thematic Coherence Principle holds was defined as the string of morphemes to which a single theme is associated. This is near circular since if the Thematic Coherence Principle holds, there could be but one theme. Let's consider an example of a compound which shows that they can contain more than a single theme. The word DISCUSS is difficult to use as a test case because of the phonetic blending rule, Theme Chaining, blends two identical themes when they occur in sequence, where sequence is defined as two themes signed with the same articulator (the left hand, the right hand or the body). Intervening signs made with a different articulator are ignored by this rule. The g-classifier (long thin object) which actually occurs three times in the word DISCUSS undergoes Theme Chaining. Therefore, the g-classifier is formed once and the right hand remains in this handshape throughout the remainder of the sign. It is difficult to determine from the surface form whether there is one or more themes.
A word from the class of cognition words which is very similar in structure to DISCUSS provides us with a clearer test case. This word, PERSEVERATE, involves the compounding of a cognition class marker THINK, (see (a) below), which differs from the locution class marker only in terms of the body part (forehead vs. mouth) to which it is associated, and the location verb, (see (b) below), FEELING-CONTACTS-A-FLAT-SURFACE.

81a. FIRST MEMBER OF THE COMPOUND: PERSEVERATE
---------------------------------------------

THINK
-----

[AT LOCI # WARD LOCI]

SEP TO+AT LOC

| forehead
g-classifier

81b. SECOND MEMBER OF THE COMPOUND: PERSEVERATE:
---------------------------------------------

FEELING-CONTACTS-A-FLAT-SURFACE
---------------------------------------------

[AT LOC] # ON LOC][+redup]

WARD LOC open 8-classifier

| (variant of mid-CL)
b-CL down (feeling)

(flat surface)

Notice that the non-clitic portions of these two words involve different classifiers. If there are two independent themes, we will see a sequence of two different classifiers. Theme chaining will not occur. The sign for PERSEVERATE, which also involves movement of the classifier clitic to compound initial position, appears below.
Here we see both the g-classifier (long thin object) and the open 8-classifier (feeling, touch) individually articulated showing that there are two themes internal to the compound.

Because of Theme Chaining and because of the possibility of compounding FROM-type and TO-type verbs which will not constitute violations of the Thematic Coherence Principle it is frequently difficult to determine whether a given word is a sequence of two words, a compound or a complex verb. The following examples are words whose exact structural representation is difficult to pin down. The form in (a) is a complex word, the one in (b) a compound, and the one in (c) a sequence of two words. The sequence of two words in (c) can be distinguished from the forms in (a) and (b) by their stress. The problem lies in distinguishing the forms in (a) from those in (b). Both forms behave as a single word. And, furthermore, although (b) has two themes, the rule of theme chaining obscures this fact, giving the appearance of a single theme in both cases.
83a. FLY-FROM-X-TO-Y (complex verb)
   /  
   [LOC1 AT+FROM & TO+AT LOCj]
    plane-classifier
   (airplane)

   'to fly from location \text{i} to location \text{j}'

83b. FLY-FROM-X--FLY-TO-Y (compound)
   /  
   [[LOC1 AT+FROM] [TO+AT LOCj]]
    plane-classifier
   (airplane) plane-classifier
   (airplane)

   'to fly from location\text{i} and fly to location\text{j}'

83c. FLY-FROM-X-AND-FLY-TO-Y (two word sequence)
   /  
   [LOC1 AT+FROM] [TO+AT LOCj]
    plane-classifier
   (airplane) plane-classifier
   (airplane)

   'to fly from location\text{i} and to fly to location\text{j}'
84a. MOVE-SOMETHING-FROM-X-TO-Y (complex verb)

\[
\text{[LOCi AT+FROM } \# \text{ TO+AT LOCj]}
\]
\[
\text{WARD LOC}
\]
\[
\text{b-handling-CL down}
\]

'to move something from locationi to locationj'

84b. MOVE-SOMETHING-FROM-X--MOVE-SOMETHING-TO-Y (compound)

\[
\text{[[LOCi AT+FROM] } \# \text{ [TO+AT LOCj]]}
\]
\[
\text{WARD LOC}
\]
\[
\text{b-handling CL down}
\]
\[
\text{WARD LOC}
\]
\[
\text{b-handling CL down}
\]
\[
\text{theme chaining}
\]

84c. MOVE-SOMETHING-FROM-X AND MOVE-SOMETHING-TO-Y (two words)

\[
\#	ext{[[LOCi AT+FROM] } \#\# \text{ [TO+AT LOCj]]#}
\]
\[
\text{WARD LOC}
\]
\[
\text{b-handling CL down}
\]
\[
\text{WARD LOC}
\]
\[
\text{b-handling CL down}
\]
\[
\text{theme chaining}
\]

3.3.2.4.2.2 The Salience Of Paths -
We rely upon the interpretation of forms like those above to distinguish their status as complex verbs \textit{versus} compounds. For example, the complex verb in (a) above involves a single theme traversing a path from LOCATION\textsubscript{i} to LOCATION\textsubscript{j} (Ex, x(FROM y TO z)). The path from Location\textsubscript{i} to Location\textsubscript{j} is salient in this complex verb. The compounded forms in (b), on the other hand, involve two identical themes in two individual acts -- the act of moving away from LOCATION\textsubscript{i} and the act of moving to LOCATION\textsubscript{j} (Ex, Ey, x(FROM LOC\textsubscript{i}), y(TO LOC\textsubscript{j}) and x=y). The path between the two points is irrelevant. Its apparent existence is a phonetic artifact of the compounding process. The direction that the theme moves in as it moves away from LOCATION\textsubscript{i} is unspecified. It is simply articulated such that the transition to the following sign will be most efficiently accomplished. The result is a straightline movement between the two points. Given the physical similarity between the (a) and (b) forms and their closeness in meaning (differing only in terms of focus on the path \textit{vs}. no focus on the path), we would expect compounds of the above type to be easily reanalyzed as complex verbs.

\textbf{3.3.2.4.3 Two Vert Sequences With Verb Chaining -}

Before concluding our overview of verb types, let's consider two final examples which illustrate the full extent of the rule of Theme Chaining we have made reference to several times already. These are two word sequences which involve Theme Chaining across both their verb themes and their clitic themes. It is crucial that we recognize such examples to be two word sequences. If they were
single lexical items, they would stand as exceptions to all our tests for word-hood. They do not behave as a single unit for purposes of stress assignment. They can contain more than one classifier clitic and this clitic can appear internal to the sequence of verbs. If these sequences were a single word, they would provide our only instances of word internal clitics at PF.

The verb sequence below would appear in a sentence meaning something like 'she jumped off of the table and onto the floor.' The signs for TABLE and FLOOR would have been previously set up in the discourse. [21] The hand with which each sign is articulated is indicated. The actual sequence of signs is not the issue here, but rather the sequences of signs made on the same articulator. Therefore, although left and right hand signs are interspersed, sequences of signs articulated with the same hand still behave as if they are adjacent to one another.

21. Actually, since FLOOR is an unmarked interpretation for the b-classifier a previous referent need not have been set up in this case.
The chaining of themes across both clitics and verbs in the above utterance certainly gives the appearance of a single lexical item. Such an assumption, however, would immediately lead to problems. As we saw in an earlier example the appearance of a source clitic in a compound with both a source and goal should be ungrammatical. Furthermore, a goal clitic also surfaces. This apparently violates the restriction against more than one classifier clitic in a single verb. Finally, this goal clitic is not realized before the entire sign, but appears temporally at the midpoint of the articulation of the verb and perseverates to serve as the final contact point of its TO-movement. This overlapping is possible because the two clitics are signed with the left hand and the verb with the right.
The only reasonable course of action is not to reject our tests for word-hood, but rather to recognize that Theme Chaining can apply not only within compounds, but across any sequences of words. Now let us consider some of the effects of this cross word Theme Chaining. This process has no effect upon the interpretation of the utterance. Only the superficial appearance is affected.

Thus far we have considered verb-verb sequences where the chained themes were embedded in movement verbs. The illusion of a path in these cases was hardly in conflict with the interpretation of the verbs. This is still the case with the verb-verb theme chaining in the example above. Seeing 'to move away from a location' and 'to move toward another location' as 'to move from one location to another' does not radically alter our interpretation of the two verb sequence.

Consider instead the case of Theme Chaining between the two clitic themes. The effect of theme chaining in this case is that rather than appearing in two separate locative clitics (AT LOC1 and AT LOCj), the b-classifier (flat surface) appears to move from LOCATION1 to LOCATIONj. In other words, the form in (a) is homophenous with the form in (b).

86a. FLAT-SURFACE-IS-AT-LOCATION1, FLAT-SURFACE-IS-AT-LOCATIONj

\[
\begin{array}{c}
\text{AT LOC1} \\
\text{b-classifier}
\end{array} \ldots \begin{array}{c}
\text{AT LOCj} \\
\text{b-classifier}
\end{array}
\]

'a flat surface is at location1...a flat surface is at locationj'

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86b. FLAT-SURFACE-GOES-FROM-X-TO-Y

LOCI AT+FROM # TO+AT LOCj

b-classifier

'a flat surface moves from locationi to locationj'

Any movement between the two clitic positions is purely a phonetic artifact. It has no effect upon the interpretation of the two verbs. The two clitics are still interpreted as purely locative.

An even more striking example involves a sequence of two locative verbs where both the verbs and their clitics are locative. There is no path of movement involved whatsoever. Still, if the themes are identical and theme chaining applies, both hands seem to move from one location to another. This movement plays no role in the interpretation. The following sequence of two verbs illustrates this case:

87. A-CUP-IS-ON-TABLEi and A-CUP-IS-ON-TABLEj

[AT LOCI # ON LOCI]

b-classifier o-classifier (rimmed object)

[AT LOCj # ON LOCj]

b-classifier o-classifier (rimmed object)

theme chaining

(left hand) (right hand) (left hand) (right hand)

'the theme chaining'

'one cup is on table and another cup is on table'
Visually this sequence of two verbs almost looks like a flat surface and a rimmed object move from being in contact with each other at LOCATIONi to being in contact with each other at LOCATIONj. The only aberration is that the two motions seem slightly out of sync with the b-classifier (flat surface) being articulated slightly ahead of the c-classifier for rimmed object.

We have included this last discussion on theme chaining in multiple verb sequences to make the point that there are some superficial phonetic processes which obscure the internal structuring of signs. Although these processes may in some cases encourage reanalysis of the internal structure of a given sign, in most cases it is so automatic as to go completely unnoticed by the signer and plays no role in the interpretation of the signs. In analyzing such signs, however, care needs to be taken in determining exactly what type of structure is involved -- complex verbs, compound verbs or multiple verb sequences.

3.3.3 Summary.

In our overview of verb types we have attempted to touch upon the various structural configurations which arise in ASL. Although our discussion was limited to verbs, similar structural possibilities exist for nouns and adjectives as well. Our discussion was as much as possible divorced from any formal analysis. This will be the focus of later chapters. Here, our goal has been to familiarize the reader with the range of existant structures in ASL and to highlight some of the issues which will be addressed in our analysis.
CHAPTER 4

WORD FORMATION: APPROXIMATIONS TOWARD AN ANALYSIS

The ASL lexicon contains a set of motion/location morphemes, an inventory of classifiers and a set of Word Formation Rules (WFRs) which produce more complex forms from combinations of these morphemes. The lexicon also contains numerous frozen forms, forms originally derived by the set of WFRs, but no longer seen as productive combinations of these more basic elements. Such lexical items, as we might expect, allow extended meanings. In fact, all signs will be seen as involving various degrees of extended meaning. We assume the word (or sign), rather than morphemes internal to a word, to be the basic unit of meaning. Signs behave like idioms. They reflect a regular morpho/syntactic pattern of organization, but also behave with respect to the syntax, and with respect to word meaning, as inviolable wholes. The regular morpho/syntactic patterns which can be seen to exist internal to words allows them to be related to one another by redundancy rules in the lexicon.
A set of literal motion/location stems form the base of the ASL lexicon. A simple set of word formation rules yields this finite set of motion/location forms. A process of Theme Association obligatorily applies to these motion/location stems producing the lexical item we call a word. Theme Association [1] associates a classifier, a noun or a gerund with the stem. Nouns and gerunds are words themselves. Thus, we get words within words. This recursion allows for an infinite expansion of the lexicon. A second expansion process is Metaphorical Extension in which the literal meaning associated with some motion/location word is extended to more abstract domains forming semantically extended word classes such as emotion, perception, cognition, locution, etc.

An initial analysis of the ASL lexicon appears in Gee and Kegl (1982a,b). This chapter extends and in many cases radically revises that original analysis. I will present here the current analysis with little comparison or contrast with the original account.

In this chapter, I will propose a category neutral X-bar account of the ASL lexicon. By category neutral, I mean that there is no need within the lexicon to make reference to categories like noun, verb, adjective, preposition. Three types of formative

1. Theme Association labels the same process referred to as "Theme Incorporation" in Gee and Kegl (1982a,b;1983a,b). The name has been changed to avoid confusion which might arise in equating this process with Nominal Incorporation in other languages. Although certain instances of Theme Association can be related to Nominal Incorporation, the standard examples involving classifiers are less clearly seen as involving incorporation.
elements will be distinguished: 1) Baseforms (FROM and TO); or as we will eventually argue, a single baseform, MOVE, 2) Affixes (the terminators IN, ON, AT and WARD); the locative argument marker (LOC); and the classifier affixes; and 3) Templates (the number agreement templates ([Xi], [XiXj], [XiXjXk], and the reduplication template [XiXi]). Chapter 3 outlined the structural characteristics of these formative elements. Here we will consider their characterization in terms of X-bar theory. In particular, we will focus upon the hierarchical characteristics of their combination.

The ASL lexicon has a syntax all its own, including minimal and maximal projections, as well as intermediate bar levels. In X-bar theory, different bar levels are indicated as follows: X, X', X'', X'''; where X is taken to be a lexical item or the minimal projection of the syntax and X'''' is taken to be a maximal projection of a given category. The X-bar structure of the lexicon can be thought of as the inverse of this system. That same element, X, which is the minimal projection of the syntax, serves as the maximal projection of the lexicon. Thus, I will notate sublexical constituents with negative bar levels. For reasons having to do primarily with the limitations of my word processor, I have chosen to notate negative bar values by placing bars to the left as opposed to the right of the category marker, or X. "'X is a baseform (MOVE). "'X is a root (e.g., MOVE+ON, ON+MOVE). This root consists of a baseform ("'X; i.e., MOVE) plus its terminator ("'X-af: AT, IN, ON, WARD). [2] The diagram below illustrates

2. Affixes will be notated by the bar level complement they take followed by "-af".
the various bar levels within the ASL sign, the labels we will refer to them by (base, root, stem and word) and the affixes they can co-occur with:

```
WORD INTERNAL X-BAR LEVELS:
---------------------------
  
  [word]  X
  /          \
 [stem]  'X 'X-af (classifier affix)
  /              \
 [root]  ''X ''X-af (LOC affix)
  /        \      
 [base]  '''X '''X-af (terminator affix)
```

Figure 1.

The above diagram does not reflect the position (before or after) at which each respective affix attaches. This will follow from independent principles. 'X consists of the root (''X) plus its locative argument marker ('''X-af: LOC); and, X consists of the stem ('X) plus its classifier ('X-af: flat surface, round solid object, long thin object, etc.) [3]

Word formation rules are of two types: headed and headless. Headed word formation rules involve two different processes:

affixation and compounding.

3. The association of gerunds and nouns to stems involve a story which is a bit more complicated. Those words which are Xs themselves are associated with an empty 'X-af position. In some instances they are reanalyzed as part of the lexical representation of the word, in others they are independent syntactic arguments productively incorporated into the word. Such examples truly illustrate the dual role the word plays as that element which straddles the boundary between the lexicon and the syntax.
Affixation involves an increase by a value of 1 in bar value. Thus the affixation of a terminator ("X-af") to a baseform ("X") yields an output of the value "X; the affixation of LOC ("X-af") to a root ("X") yields a stem of the value 'X; and the affixation of a classifier ("X-af") to a stem ("X") yields a word.

Compounding, on the other hand, transfers characteristics of the head directly to the dominating node, with no change in bar level. When we consider the structure of complex signs, we will contrast two different compounding analyses of these forms. The first, which corresponds to the original Gee/Kegl analysis of these forms, combines two stems (Xstem+Xstem) to yield a compound of the same bar level:

Gee/Kegl Analysis of Compounding: [4]

\[
\begin{array}{c}
\text{Xstem + Xstem} \\
\text{Xstem} \quad \text{Xstem}
\end{array}
\]

\[e.g., [ [\text{LOC AT+FROM}] + [\text{TO+AT LOC}] ] \]

\[
\begin{array}{cccc}
\text{Xs} & \text{Xs} & \text{Xs} & \text{Xs} \\
\end{array}
\]

\text{Figure 2.}

We will reject the Gee/Kegl analysis in favor of a second analysis which sees this compounding process as a combination of a baseform (TO, FROM) and a stem (M+T LOC1). The output of this combination is a compound with the characteristics of its leftmost member, the base form.

4. Of course, in the Gee/Kegl analysis these formatives were not considered to be category neutral. They were all assumed to be verbs. Nor was any hierarchical structure in terms of X-bar Theory proposed.
PROPOSED ANALYSIS OF BASE-FORMING COMPOUND:

\[ [\text{Xbase} + \text{Xstem}] \]
\[ \text{Xbase} \quad \text{Xbase} \]

\text{e.g.,} \quad [\text{[from]} \quad \text{[TO+AT LOC]} \quad ]
\[ \text{Xb} \; \text{Xb} \; \text{Xb} \; \text{Xs} \quad \text{Xs} \; \text{Xb} \]

\text{Figure 3.}

We will label this compounding process Base Formation (BF). To this new base form subsequent affixations of a terminator and LOC occur eventually yielding the full string: \text{LOCi AT+FROM+TO+AT LOCj}. The hierarchical structure of this string differs from the one predicted in the Gee/Kegl analysis. Both analyses can be characterized in the formalization proposed here. However, it will be shown that the stem compounding analysis produces several ungrammatical surface forms and thus must be rejected.

Comparison and contrast of processes of affixation and compounding reveal interesting observations concerning the interaction of the increment versus non-increment of bar-level values and the occurrence of formatives which are obligatorily heads. Affixes, which cause an increment in bar level can be distinguished from bases, roots and stems by the fact that affixes must serve as the head of the constituent in which they occur. Base forms and stems, on the other hand, may or may not serve as heads. Whether or not they are heads is tied to the position in which they occur (initial or final), in conjunction with the stipulation of head position which is determined by the lexical level at which the combination occurs. For example, Compound Verbs and Negated verbs both involve the compounding of a base form and a
stem. In one instance (complex verbs) the base form is in head position and thus a base form is the output. To this output an additional terminator and LOC can be attached yielding a structure with two terminators and two LOCs.

**COMPOUNDING IN COMPLEX VERBS:**
-----------------------------

```
/base form
\/
head /  \  
/  \  
base form  stem
```

Figure 4.

In Negated verbs the stem occurs in the head position of the compound, yielding a stem as an output. This output can only combine with stem affixes (classifiers) and thus will remain a single argument (LOC) word.

**COMPOUNDING IN NEGATED VERBS:**
-----------------------------

```
/stem
\/
head /  \  
/  \  
stem  base form
```

Figure 5.

We will return to these compounding processes later.

We know that affixes are heads for several reasons. First, unlike base forms, roots and stems, they obligatorily appear in head position; where head position is determined by the morphological level at which the affix is attached. Other
orderings are ungrammatical. Second, affixes serve as lexical heads in the sense that they receive the index in number agreement and the theta-role in theta role assignment. Both of these assignments apply to the word stem, but since the word stem is a projection of LOC, it receives both the theta-role and number agreement marking. There isn't a test of the second sort for terminators, but they do obligatorily occur in head position or not at all. We will see in Chapter 5 that terminators have some unique properties all their own and that the configuration of movement and terminator which we label a root plays an interesting role in the determination of thematic roles.

There is also evidence which suggests that the classifier affix is the head of a word. First, it is the classifier affix (classifier, noun or gerund) which is assigned the theta-role, theme. Thus, this "head" receives its theta-role in the same manner in which LOC receives a non-theme theta-role. [5] Second, in ASL words a gerund in the classifier affix position has scope over its complement, the word stem ("X"). For example, in a sentence like the ASL equivalent of the English sentence Lisa walked from the car to the house, walking is in the classifier affix position and from the house to the car is its complement. The word is interpreted as follows; where walking functions as an event which has scope over the path:

5. Further Evidence will be presented in Chapter 5. It concerns the interaction of causative marking (the presence of a handling classifier in this affix position), theta-role assignment and Noun Incorporation.
Ex, $x$ = an event of walking & $x$ moves from the car to the house.

The clause in which the ASL equivalent of walking is embedded corresponds to the PP phrase of the English sentence. As we will see later, the apparent flip in dominance is really a phonetic effect. Classifier affixes although they dominate the motion location string are realized unordered with respect to it. This is the result of a structural reanalysis of head position at the third level level of the morphology where classifier affixes are attached. Head position at this level is stipulated to be unordered. The phonetic motivation for this comes from the set of basic classifier forms which consist of nothing more than a handshape which in order to be realized must be mapped onto a movement (much like a tone must be mapped onto something which is [+syllabic]). Thus, it is easier to understand why the matrix movement (the complement of the classifier affix) frequently has the interpretation of an adjunct. For example, in a sentence like the ASL equivalent of the English sentence: 'Lisa walked from the car to the house,' walking is in the classifier affix position and from the car to the house is its complement.
1. 'Lisa walked from the car to the house.'

In the above example the nouns for 'house,' 'car' and 'Lisa' are represented in gloss form rather than their full motion/location representations in order to save space. As we pointed out in Chapter 3, these are actually associated with a locational string which can be thought of and a noun frame (AT LOC 0). They also have an internal motion/location structure of their own, but this internal structure is irrelevant to the syntax. It is important, however, to recognize that even nouns must be associated with a motion location string—even if that string consists of the neutral index and the least marked of the locational morphemes (AT). See below:

6. The role prominence marker which would normally occur in this position has been omitted to save on space.

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2. HOUSE (noun)

\[\text{at loc} \quad \emptyset \]
\[\text{house} \]

The absence of an index is the only thing which distinguishes the noun above from the clause below:

3. 'a house is at a location'

\[\text{at loc} \quad i \]
\[\text{house} \]

4.1 ROOT AND STEM FORMATION

In this section we will work through a series of approximations toward a final formalization of the word formation rules involved in root and stem formation. Our aim is to arrive at a set of representations which will characterize both the morphophonological and the lexical structures involved in word formation.

Certain aspects of ASL morphology involve the linear arrangement of morphemes (morphemes occurring in a temporal sequence), others involve a non-linear arrangement (morphemes realized simultaneously, but by separate articulators—the arm vs. the hand, the right hand vs. the left hand, the body vs. the limbs, the face or head vs. the limbs or body, etc.). There are also certain aspects of the morphology which are in one sense
simultaneous, yet must also be linearized. Such processes we will term "non-concatenative." A non-concatenative process involves mapping some morphological unit (root, stem, word) into a template such that the final phonetic linearization of the word involves the interspersing of morphemes. Number Agreement, for example, maps a stem into one of a set of three templates of the following form:

\[
\begin{align*}
\text{NUMBER AGREEMENT TEMPLATES:} \\
\text{-----------------------------} \\
\text{Singular} & \quad [x] \\
& \quad i \\
\text{Dual} & \quad [x, x] \\
& \quad i \; j \\
\text{Plural} & \quad [x, x, x] \\
& \quad i \; j \; k \\
\text{Condition: where } x = \text{verb;} & \\
& \text{and, } i, j \text{ and } k \text{ are disjoint in reference}
\end{align*}
\]

Figure 6.

The final result is a series of stems of the form:

\[
\begin{align*}
\text{OUTPUT OF NUMBER AGREEMENT TEMPLATES:} \\
\text{-----------------------------} \\
[\; Xs \; ] & \quad , \quad [\; Xs \; Xs \; ] \; \text{or} \; [\; Xs \; Xs \; Xs \; ] \\
Xs \; i \; Xs & \quad Xs \; i \; j \; Xs \quad Xs \; i \; j \; k \; Xs
\end{align*}
\]

Figure 7a.

where the number agreement morphemes are of the form:

\[
\text{NON-CONCATENATIVE INDICES:} \\
\text{-----------------------------} \\
[\; \ldots \i \ldots \] & \quad , \quad [\; \ldots \i \ldots \j \ldots \] \; \text{or} \; [\; \ldots \i \ldots \j \ldots \k \ldots \]
\]

Figure 7b.

and the other morphological unit, the stem, spreads to each of the
x-positions and, therefore, in the case of a non-singular word, is phonetically realized in two or three non-concatenated positions:

\[ \text{NON-CONCATENATIVE STEMS:} \]
\[ \text{--------------------------} \]
\[ \text{[...Xs...], [...Xs...Xs...] or [...Xs...Xs...Xs...].} \]

Figure 7c.

Indices of the above sort \((i,j,k)\) are, by the way, phonetically realized in ASL. These indices are later set equal to actual positions in the signing space which are uniquely tied to NP referents in the sentence or discourse.

Word formation in ASL involves processes of all three types. In this discussion of root and stem formation we will discuss rules which result in a linear morphological output (root formation, stem formation and compounding) and one rule which results in a non-concatenative output (number agreement). Theme Association, an affixation process which results in a second kind of non-linearized output, will be the focus of a later section.

4.1.1 An ML-Template Approach

Our discussion will be divided into three parts: 1) a discussion of root formation; 2) a discussion of stem formation; and 3) a discussion of compounding, which can result in a new base form which can then combine with an additional terminator to form a complex root. An account of ASL word formation in terms of a level ordered morphology will be proposed. In the next two sections, however, we will present an initial formalization of root and stem formation without any reference to a level ordered morphology.
This analysis relies heavily upon phonological properties of the motion morphemes to predict their linear ordering with respect to terminators and locative argument markers.

4.1.1.1 Root Formation: An ML-Template Approach

The following roots are present in ASL:

\[
\begin{array}{ll}
\text{MOBEMENT ROOTS} & \text{LOCATION ROOTS} \\
\hline
\text{AT+FROM} & \text{TO+AT} & \text{∅+AT} & \text{AT+∅} \\
\text{IN+FROM} & \text{TO+IN} & \text{∅+IN} & \text{IN+∅} \\
\text{ON+FROM} & \text{TO+ON} & \text{∅+ON} & \text{ON+∅} \\
\text{WARD+FROM} & \text{TO+WARD} & \text{∅+WARD} & \text{WARD+∅}
\end{array}
\]

Figure 8.

Each root is composed of two parts: a motion morpheme (TO, FROM) and a terminator affix (AT, IN, ON or WARD). The location roots are formed in the same way as movement roots. Consequently, our discussion of verb root formation need only focus upon movement roots.

The terminators are affixes. They combine with motion morphemes to yield roots. Thus we get structures of the following two types:

\[
\begin{array}{l}
\text{STRUCTURE OF ROOTS:} \\
\hline
\text{Xr} & \text{Xr} \\
/ \backslash & / \backslash \\
/ \backslash & / \backslash \\
\text{TO [Terminator]} & \text{[Terminator]} \text{ FROM}
\end{array}
\]

Figure 9.
These two possible root schemas are mirror images of one another. If we could predict the position at which the terminator attaches from some independent principle, we could greatly simplify the statement of the rule. The obvious next step is to predict the ordering of the terminator from some lexical property of the motion base. We will consider two possibilities. The first involves association of the motion morpheme with a ML-template (comparable to a CV-template, but consisting of movement and location slots rather than consonants and vowels.) The second alternative involves assuming a level ordered morphology where position of affixation is determined by the level at which affixation takes place -- the TO and FROM morphemes would be introduced at different levels. The two alternatives can be distinguished by the rule of base formation (a compounding process), but they make similar predictions in the case of root and stem formation.

In ASL, the basic phonological opposition is between movement and absence of movement (or location). This is comparable to the spoken language opposition between vowels and consonants. The sign can be viewed as a string of movements (Ms) and locations (Ls), much like the spoken word is a string of Consonants and Vowels. This analogy does not carry over entirely because ASL allows not only a linear sequence of Ms and Ls, but also allows ML sequences to be embedded within a single movement. This is a fascinating option open to manual languages. Discussion of the implications of such a property would constitute a dissertation in and of itself. Luckily, for our present discussion, the ML-template/CV-template analogy holds. This is because we are focussing solely on the
matrix string, independent of any possible embedded nominals. For an illustration which distinguishes the matrix string from its nominal embeddings, consider the following two verbs, GIVE and LIKE, which appear below in their lexical representation (A) and a phonological representation in terms of Ms and Ls (B):

EXAMPLES OF ML-SEQUENCES WITHIN ML-SEQUENCES:

(A)  [(A)
LIKE:  
\[ \text{WARD LOC} \]

\[ \text{LOC ON+FROM} \]

\[ \text{chest TO+ON LOC [recip]} \]

\[ g-\text{CL/th-CL [7]} \]

(B)  [(B)
\[ \text{ML} \]

\[ \text{LM} \]

\[ \text{middle finger/thumb (opposed)} \]

Figure 10.

GIVE:  
\[ \text{LOC WARD+FROM+TO+WARD LOC} \]

\[ \text{WARD LOC} \]

\[ \text{ON LOC up} \]

\[ b-\text{CL/th-CL} \]

(B)  [(B)
\[ \text{LM-ML} \]

\[ \text{ML} \]

\[ \text{ML} \]

\[ \text{flat hand/thumb (opposed)} \]

Figure 11.

That portion of the word which is in the box is what we consider to be the matrix string. The root formation rules we will discuss here characterize the strings at all levels from matrix string to most deeply embedded strings. It is the recursive process of

7. Clitic of reciprocal handling classifier has been omitted. It is predictable from the reciprocal marking on the TO+ON LOC string. We will systematically omit them from now on.
embedding words within words which results in a linear realization of Ms and Ls within each individual string, but a non-linearized relation of strings to other strings within a multiply embedded structure.

Let's take an autosegmental perspective on the ASL sign which assumes that features (or feature complexes) corresponding to movements and to locations in space are mapped onto some ML-template. Furthermore, let's presume that motion roots like TO and FROM are prelinked in the lexicon with the following two templates:

```
MOTION BASES PRE-LINKED TO TEMPLATES:
----------------------------------------
                    TO                     FROM
                  M L                    L M
```

Figure 12.

Actually, if we adopt such a representation, a differential labelling of TO and FROM becomes redundant. The movement in both verbs is identical. The position of L with respect to the movement captures the distinction between the two. If it precedes the movement (LM), it functions as a source, thereby indicating a FROM verb. If it follows the movement (ML), it functions as a goal, thereby indicating a TO verb. The two representations below would be equally as informative as their redundant counterparts:

```
NEUTRALIZATION OF TO AND FROM:
-------------------------------
                    MOVE                     MOVE
                  M L                    L M
                  (TO)                  (FROM)
```

Figure 13.
Such a representation again highlights the isomorphism between the morphology, phonology and semantics in ASL. In notating signs we will retain the labels TO and FROM to aid in the reading of representations. However, remember that when mapped to a ML-template, they both equal MOVE.

Given such a representation for FROM and TO, we can state the rule of Root Formation as follows:

ROOT FORMATION (Morphophonological Representation):

\[
\begin{array}{c|c|c}
\text{MOVE} & \text{Term} \\
\hline
\hline
\hline
\hline
\end{array}
\]

\[
\begin{array}{l}
\text{M} \\
\text{L} \\
\text{Term} = \text{Terminator: IN, ON, AT, WARD}
\end{array}
\]

Figure 14a.

Basically, the rule above states that a terminator is inserted on the same side of the movement root that the L slot occurs at, yielding a single movement TO+ON. In terms of word formation we need only state that MOVE combines with a terminator affix to yield a root.

ROOT FORMATION (Lexical Representation):

\[
\begin{array}{c}
\text{Vr} \\
/\ \\
/ \ \\
/ \ \\
\text{MOVE, [Terminator]} \Rightarrow \text{MOVE} [\text{Terminator}]
\end{array}
\]

Figure 14b.

This rule says nothing about the ordering of these two morphemes. Ordering is conditioned by a lexically specified phonological

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property of the motion root.

4.1.1.2 Stem Formation: An M-Template Approach –

We find the same mirror image properties associated with root formation to be evident in stem formation as well. As can be seen in the examples below, the locative argument marker attaches to the same side of the root where the terminator is attached.

POSSIBLE STEMS:

| LOC AT+FROM | TO+AT LOC | ø+AT LOC | LOC AT+ø |
| LOC IN+FROM | TO+IN LOC | ø+IN LOC | LOC IN+ø |
| LOC ON+FROM | TO+ON LOC | ø+ON LOC | LOC ON+ø |
| LOC WARD+FROM | TO+WARD LOC | ø+WARD LOC | LOC WARD+ø |

Figure 15.

This parallel seems intuitively obvious since the locative argument marker marks the anchor point for the movement of the stem -- its source in the FROM stem and its goal in the TO stem; and, the terminator marks the relation the stem has at this relevant beginning (or end) point of its movement. Given the template representation of the motion root, the rule of stem formation is fairly straightforward. The locative argument marker is an affix. It attaches to a root yielding a stem.

STEM FORMATION (lexical representation):

```
Xs
\/
\_ (Mirror Image)
/ \
Xr, [LOC] => Xr [LOC]
```

Figure 16a.
The ordering of the morphemes is predictable from the movement root and its template. The locative argument marker will fill the L slot of the ML-template. The rule can be stated as follows:

STEM FORMATION (morphophonological representation):

\[
\begin{array}{c}
M & L \\
\_ & \_ \\
\_ & LOC \\
\end{array}
\]

(mirror image)

Figure 16b.

By stating the above rule in terms of variables we can eliminate the need to specify that it is a mirror image rule:

STEM FORMATION:

\[
\begin{array}{c}
X & L & Y \\
\_ & \_ \\
\_ & LOC \\
\end{array}
\]

Figure 16c.

This rule will give us the correct ordering of morphemes in both the FROM (LY) and TO (XL) type stems.

Let's examine two sets of sample representations. We will use three different representations. The first is a lexical representation. It is hierarchical and reflects the ordering of application of the word formation rules and the relation between affixes and the category of the newly formed lexical item. The second representation is morphophonological. It represents the ordering of elements as they will be realized in the surface
phonetic form. The third representation is a hybrid of the first two. It incorporates labelled bracketing into the morphophonological representation giving us the benefits of both types of representation.

SAMPLE REPRESENTATIONS:
-----------------------

TO+ON LOC (Lexical Representation):
-----------------------------------

\[
\begin{align*}
\text{TO} & \Rightarrow \text{TO [ON]} \Rightarrow \text{TO [ON] [LOC]} \\
\text{(RF)} & \Rightarrow \text{(SF)}
\end{align*}
\]

Figure 17a.

TO+ON LOC (Morphophonological Representation):
-----------------------------------------------

\[
\begin{align*}
\text{TO} & \Rightarrow \text{TO ON} \Rightarrow \text{TO ON} \\
| & \text{(RF)} & | / & \text{(SF)} & | / \\
| & | / & | / \\
M L & M L & M L & | \\
& & & \text{LOC}
\end{align*}
\]

Figure 17b.
HYBRID REPRESENTATION:
------------------------

Figure 17c.

8. The two alternate applications of Stem Formation illustrate the fact that the locative argument marker (LOC) could be prefixed or suffixed and still end up realized in the same position.
LOC ON+FROM:

Lexical Representation:

\[ X_s \]
\[ X_r \]
\[ \text{FROM, [ON]} \implies [ON] \text{FROM} \implies [LOC] [ON] \text{FROM (RF)} \]
\[ \text{(SF)} \]

Figure 18a.

Morphophonological Representation:

\[ \text{FROM} \implies [ON] \text{FROM} \implies [ON] \text{FROM (RF)} \]
\[ \text{(SF)} \]
\[ L \ M \]
\[ L \ M \]
\[ L \ M \]
\[ \text{LOC} \]

Figure 18b.
The hybrid representation highlights certain ordering issues. The LOC affix has no association with an L slot. It is introduced after root formation and is associated with an already existing L slot in the root. Is there any reason to presume this element is introduced to the right vs. left of the root?

**Suffixation vs. Prefixation of LOC:**

```
[ [    ] LOC ] vs. [ LOC [  ] ]
Xs Xr Xr Xs Xs Xr Xr Xs
```

Figure 19.
Both of these representations yield the same output in the simple cases. This is because here the LOC is assumed to be on a separate tier and, therefore, is unconstrained by any ordering relation with respect to TO and ON. In the case of simple roots there is only one L slot and it is unfilled. There is no previously linked material sharing the same tier with the LOC which might block its association to the ML-template. Thus, for these examples, ordering of the LOC with respect to the root is irrelevant to the phonetic output of the rule:

```
= TO ON LOC
```

```
===> TO ON LOC
```

Figure 19.

Figure 20.
We cannot choose between the above representations on the basis of the data examined thus far. What we need are more complex examples involving words with more than one L slot, some pre-linked to LOCs and others empty. If the verb contains any LOCs already associated with L-slots, we can use a prohibition against crossing lines to determine the side of the verb stem on which the LOC is affixed. Of course, if we show that such an ordering needs to be imposed we bring into question the existence of a LOC-tier which is independent from a movement tier. Consider the schemata below:

STATUS OF LOC ON AN INDEPENDENT TIER:

\[
\begin{array}{cccc}
\text{Xs} & \text{Xr} & \text{Xr} & \text{Xs} \\
\text{Xs} & \text{Xr} & \text{Xr} & \text{Xs}
\end{array}
\]

\text{Independent LOC tier) (movements and LCCs share a single tier)}

Figure 21.

In either case, the ML-template stipulates the position of LOC, in the same way that it stipulated the position of terminator affixation. In both cases, however, we must recognize that the ML-templates associated with the TO and FROM are still functioning as diacritics. The linking of the L slot to the left or right of the movement root gives it certain global properties. The terminator can in essence look at where the LOC will later attach to determine its place of affixation. The ML-template proves useful in representing the morphophonological properties of the ASL
sign. Such a representation will prove particularly useful when we examine classifier affixation, a process where hierarchical information is obscured by the fact that the classifier affix must be mapped onto a movement slot and cannot occur independently. However, hierarchical information concerning the combination of these formatives is essential.

4.1.2 A Level Ordering Account

Initially, we noted that word formation rules could be greatly simplified if we let the mirror image behavior of TO and FROM type verbs fall out from an independent lexical property of the verb roots TO and FROM. This still seems a reasonable assumption. Instead of conditioning the position of affixation by some ML-template, we propose to relate position of affixation to the level at which that affixation occurs. This is tantamount to saying that suffixation occurs at one level and prefixation at another. An interesting feature of ASL is that the same affixes can appear at two different levels, and, correspondingly, their position varies. This we will presume to be evidence that the property of being a prefix vs. suffix is a function of morphological level rather than a feature of the morpheme itself. In fact, occurrence of an affix at a particular level is equivalent to the existence of the word formation rule which affixes it being present at that level.
In the following discussion we will examine two levels (Level 1: suffixation; Level 2: prefixation) and four word formation rules (root formation, stem formation, base formation (compounding) and number agreement). In a later section, we will address additional levels and rules involving theme association, cliticization and compounding.

Let's begin our discussion with a sketch of the two levels we will focus upon:

**LEVEL 1: SUFFIXATION (head final)**

<table>
<thead>
<tr>
<th>MORPHEMES</th>
<th>RULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>[TO]</td>
<td>(Complex Verb Root Formation)</td>
</tr>
<tr>
<td>X₀ Xb</td>
<td></td>
</tr>
<tr>
<td>{[AT], [IN], [ON], [WARD]}</td>
<td>Verb Stem Formation</td>
</tr>
<tr>
<td>[LOC]</td>
<td>Verb Formation</td>
</tr>
</tbody>
</table>

**singular:** [Xᵢ]

| Xs | Xs |

**dual:** [Xᵢ'Xⱼ]

| Xs | Xs |

**plural:** [Xᵢ'Xⱼ'Xk]

| Xs | Xs |

Figure 22a.
LEVEL 2: PREFIXATION

MORPHEMES

[FROM]
Xb  Xb

{[AT], [IN], [ON], [WARD]}  Root Formation

[LOC]

Stem Formation

singular: ['Xι]
Xs  Xs

Number Agreement

dual:  ['Xι'Xj]
Xs  Xs

plural:  ['Xι'Xj'Xk]
Xs  Xs

Figure 22b.
WORD FORMATION RULES:
---------------------

BASE FORMATION:
Xb , Xs ==> [Xb + Xs]  
          Xb    Xb

ROOT FORMATION:
Xb , Term ==> [Xb + [Term] ]  (mirror image)  
            Xr    Xr    Xr    Xr

STEM FORMATION:
Xs , LOC ==> [Xs + [LOC] ]  (mirror image)  
          Xs    Xs    Xs    Xs

NUMBER AGREEMENT:
Xs , sg ==> ['Xi ]  
          Xs    Xs

Xs , dual ==> ['Xi 'Xj ]  
            Xs    Xs

Xs , plural ==> ['Xi 'Xj 'Xk ]  
              Xs    Xs

Figure 23.

If we recognize a distinction between base forms and affixes, it becomes clear that the morpheme central to Level 1 is TO and the morpheme central to Level 2 is FROM. All the affixes are present at both levels. The word formation rules which correspond to these affixes are also level independent. The rule of Base Formation (Compounding) does not apply at Level 1 simply because its structural description is not met. Rules apply only once at each level and, since Base Formation is ordered first, there is no stem to which the base form TO can affix. This fits with the fact that,
unlike the other processes we will be considering, Base Formation
is not a mirror image rule. It exhibits only the properties of
Level 2 combinations -- the head or element which determines the
value of the node which dominates this compound is on the left, as
are all Level 2 heads. Let's examine some simple cases of root and
stem formation which are parallel to the examples previously
discussed.

Except for the incorporation of some nominal and the
cliticization of a classifier clitic, which occur at a later level,
the verb meaning "a vehicle moves onto a flat surface" is
completely formed at Level 1. Its "derivation" proceeds as
follows. For now we will consider only the singular form of this
verb.

LEVEL 1 AFFIXATION: A-VEHICLE-MOVES-ONTO-A-FLAT-SURFACE:
-------------------------------------------------------------

Level 1

TO => TO+ON => [TO+ON]+LOC => [TO+ON]+LOCi...TO+ON LOCi
(RF) (SF) NA
(singular) 3-classifier

Figure 24.

Notice that, as expected, all affixes are on the right. Now,
consider a similar example meaning "a vehicle moves off of a flat
surface." This form attaches primarily at Level 2 as is evidenced
by the fact that affixes are all on the left.

- 289 -
Level 2 Affixation: A-VEHICLE-MOVES-OFF-OF-A-FLAT-SURFACE:

Figure 25.

Let's now consider the details of Number Agreement. Number Agreement involves mapping the output of stem formation into one of three number agreement templates:

NUMBER AGREEMENT TEMPLATES:

singular [ 'Xi' ]
Xs  Xs

dual [ 'Xi' 'Xj' ]
Xs  Xs

plural [ 'Xi' 'Xj' 'Xk' ]
Xs  Xs

Figure 26.

The indices (i, j and k) are distinct from one another. They will eventually be co-indexed with actual points in the signing space. Number agreement applied to the two examples discussed above would yield the following forms:
NUMBER AGREEMENT:  [TO+ON] LOC

-----------------------------
sing.  TO+ON LOCI

dual  TO+ON LOCi TO+ON LOCj

plural  TO+ON LOCi TO+ON LOCj TO+ON LOCK

LOC [ON+FROM]

-----------------------------

LOCI ON+FROM

LOCI ON+FROM LOCj ON+FROM

LOCI ON+FROM LOCj ON+FROM LOCK ON+FROM

Figure 27a.

The actual form of these stems would be:

LABELED BRACKETING OF THE OUTPUT OF NUMBER AGREEMENT:

---------------------------------------------------------------------

[[TO ON LOC]i ]
Xs Xs

[[TO ON LOC]i [TO ON LOC]j]
Xs Xs

[[TO ON LOC]i [TO ON LOC]j [TO ON LOC]k ]
Xs Xs

---------------------------------------------------------------------

[[LOC ON FROM]i ]
Xs Xs

[[LOC ON FROM]i [LOC ON FROM]j ]
Xs Xs

[[LOC ON FROM]i [LOC ON FROM]j [LOC ON FROM]k ]
Xs Xs

Figure 27b.

The LOC bears the index assigned to the entire verb.
The Level Ordering Approach nicely accounts for the position of affixation, but involves a lot of machinery just to distinguish the behavior of TO and FROM-type forms. Clearly, more evidence for these ordered levels is needed. Examination of examples involving the formation of complex base forms offers additional support for such an analysis.

4.1.2.1 Base Formation And Its Consequences

In this section we will examine the structural characteristics of double agreement FROM-TO forms. The following is a list of the possible structures which can be produced as the result of base formation in conjunction with the other word formation rules we have discussed. We present these schemata in their singular form for both source and goal and with no indication of their internal structure. The internal structure of these verbs will be the focus of our discussion.
POSSIBLE DOUBLE ARGUMENT STRUCTURES:
-----------------------------

LOC1 AT+FROM+TO+AT LOCj
LOC1 AT+FROM+TO+IN LOCj
LOC1 AT+FROM+TO+ON LOCj
LOC1 AT+FROM+TO+WARD LOCj

LOC1 IN+FROM+TO+AT LOCj
LOC1 IN+FROM+TO+IN LOCj
LOC1 IN+FROM+TO+ON LOCj
LOC1 IN+FROM+TO+WARD LOCj

LOC1 ON+FROM+TO+AT LOCj
LOC1 ON+FROM+TO+IN LOCj
LOC1 ON+FROM+TO+ON LOCj
LOC1 ON+FROM+TO+WARD LOCj

LOC1 WARD+FROM+TO+AT LOCj
LOC1 WARD+FROM+TO+IN LOCj
LOC1 WARD+FROM+TO+ON LOCj
LOC1 WARD+FROM+TO+WARD LOCj

Figure 28.

The M-Template discussed previously gives us no information concerning the hierarchical structure of double argument verbs (by this we mean verbs which contain 2 LOCs).

It only characterizes the surface string. Any labelled bracketing used to supplement this notation requires a hierarchical analysis of these forms. The Level Ordered Analysis will aid us in narrowing in on a single hierarchical representation for these forms.

4.1.2.2 Two Analyses Contrasted -
Below we will compare two analyses of ASL word formation: the analysis proposed in Gee and Kegl (1982a) and the category-neutral, level ordered analysis advocated here. Gee and Kegl (1982a,b) proposed a set of "conjoining rules" which combine movements and terminators. These were followed by a rule of LOC assignment which, depending upon the lexically specified position at which a verb.root was to take its LOC, affixed a LOC before or after this root. This movement+terminator root plus its LOC constituted a stem which lacked only number agreement and theme association. Complex verbs like GIVE were formed by a process of "concatenation" which applied after Number Agreement but before Theme Association, combining two stems (root+LOC+number) to form a concatenated FROM-TO verb. A nominal (theme) was eventually incorporated into the movement slot of this complex verb. In the above discussion, I have regularized the terminology with respect to the units labeled as roots and stems. These distinctions were not made in the Gee/Kegl analysis which referred to all these formatives as Verbs. The Gee/Kegl account of ASL word formation is summarized below:

I. BASIC SET OF FORMATIVES:

\[\begin{array}{cccc}
\text{MOVER} & \text{NEGATOR} & \text{ORIENTER} & \text{TERMINATORS} \\
\text{____} & \text{____} & \text{____} & \text{____} \\
\text{TO} & \text{FROM} & \text{WARD} & \text{IN} \\
& & & \text{ON} \\
& & & \text{AT} \\
& & & \text{WARD} \\
\end{array}\]

Figure 29.

The lines in the above chart indicate the lexically specified position at which these formatives will eventually take their
locative argument.

II. BASIC SET OF RULES:

---------------------

A. CONJOINING RULE: [9]

V, V ==> [V+V] (e.g., [ON+FROM], TO+ON)

V V

Figure 30.

B. LOC ASSIGNMENT:

--------------

LOC is affixed to the position at which the V or
the head of a conjoined V is specified for taking its
locative argument. The head of a conjoined verb is its
rightmost member.

Figure 31.

C. CONCATENATION RULE: [10]

----------------------

LOC V, V LOC ==> LOC V # V LOC

Figure 32.

D. NUMBER AGREEMENT: (same for both analyses)

--------------

Figure 33.

I will not go into the details of this analysis here. The

9. The constraints on combinations were specified
by a set of individual rules: The Terminator Rule, The
Negator Rule and The Orienter Rule. Each rule
specified which types of formatives were to be combined
and their respective orderings.

10. The initial V was restricted to FROM and the
second V to TO or WARD.
reader is referred to Gee and Kegl (1982b). We will be concerned more with the general order in which combinations take place. Combinations of Movements and Terminators precede LOC assignment; and LOC assignment precedes concatenation. All double argument verbs (e.g., GIVE) were assumed to involve concatenation of two fully formed stems with their LOCs already attached and already marked for number agreement. The Gee and Kegl analysis predicted the following hierarchical structure for a sign like GIVE (prior to Theme Association):

GEE AND KEGL PREDICTED STRUCTURE: [11]

```
  [Xs]
 /    \\   \
 /      \   \
 /        \   \
   [Xs]i  [Xs]j
 /   \    /   \  \
 /   \  /   \  \\
 Xr  Xr
 /  /  /  /  \\
LOCi Term FROM TO Term LOCj
```

Figure 34.

According to the Gee/Kegl analysis, the two stems, [LOC Term FROM] and [TO Term LOC], are formed at the same level by the same word formation rules. Their ordering is determined by the

11. In this example, several changes have been made to make comparison with the analysis proposed here more perspicuous. Category neutral Xs have been substituted where Gee and Kegl would have used Vs. The references to roots, stems and words have been regularized.
templates associated with TO and FROM in the lexicon. Number agreement applies to each of these stems independently, and then they are concatenated to form a complex two argument stem. (Actually, where we use "stem" above, Gee and Kegl would have used the word "verb."

The account proposed here, however, assumes that the word formation processes being considered apply at two different levels in the lexicon. Each level contains the same set of word formation rules and the same set of affixes. The only differences are: 1) Level 1 is specified as head final and Level 2 is specified as head initial; thus affixes attached at Level 1 will follow their complements and affixes attached at Level 2 will precede; 2) the output of Level 1 is available to the word formation rules in Level 2 (in particular, a stem is available for the rule of Base Formation which compounds a base form and a stem to yield a complex base form; and 3) the base form TO is present at Level 1 and FROM is present at Level 2. [12] To summarize, we have the following set of formatives, rules and head position stipulations:

12. The third characteristic is stated this way for expository purposes. It will be revised later to reflect the fact that TO and FROM are one in the same base form, i.e., MOVE.
I. THE BASIC SET OF FORMATIVES:

<table>
<thead>
<tr>
<th>BASE FROMS</th>
<th>AFFIXES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO</td>
<td>IN</td>
</tr>
<tr>
<td>FROM</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>AT</td>
</tr>
<tr>
<td></td>
<td>WARD</td>
</tr>
<tr>
<td></td>
<td>LOC</td>
</tr>
</tbody>
</table>

Note: There is no lexical stipulation as to the position at which the affixes are to be attached except for the head position stipulated for each level of attachment.

Figure 35.

II. BASIC SET OF RULES:

A. COMPOUNDING:

\[ \text{base form, stem } \Rightarrow \text{baseform [13]} \]
\[ \Rightarrow \text{stem} \]

B. TERMINATOR AFFIXATION:

\[ \text{base form, terminator } \Rightarrow \text{root} \]

C. LOC AFFIXATION:

\[ \text{root, LOC } \Rightarrow \text{stem} \]

D. Number Agreement: (same as described earlier, templates)

Figure 36.

III. LEVEL ORDERING INFORMATION

Level 1 is head final

Level 2 is head initial

Figure 37.

13. Two outputs are possible because since neither the base form or the stem is an affix, they can co-occur in either order; i.e., either can occur in the head position. None of the rules refer to ordering. Ordering follows from two factors: 1) whether the elements combined are affixes or not and 2) level of attachment.
The structure predicted by the Level Ordering analysis appears below:

LEVEL ORDERING PREDICTED STRUCTURE:
----------------------------------------

```
[Xs]i
 / \ /
 / Xr /
 / / Xb /
 / / / [Xs]j /
 / / / / \ \ /
 / / / / Xr \ \ /
 / / / / / \ \ 
LOCi Term FROM TO Term LOCj
```

Figure 38.

The level ordering analysis assumes the stem [TO Term LOC] to be formed at Level 1 and number agreement to apply to it at that level as well. Evidence for this is the rightward attachment of affixes. FROM is attached to this fully formed stem at Level 2 to yield a base form. Evidence for this is the fact that FROM is a Level 2 morpheme [14] and that it attaches to the left. We know FROM is the head because it compounds with the stem yielding a complex base form. In other words, it determined the value of the dominating node. We know the resulting structure is a base form rather than a stem because a terminator can attach to it to form a root. And, in turn a LOC can affix to this complex to yield a stem. This stem verb then feeds the number agreement rule.

14. Of course this doesn't constitute very strong evidence since we merely stipulated this fact. We will return to this issue at the end of this chapter.
Remember that number agreement maps stems ('Xs) into an indexed number agreement template. Such a process should distinguish between the two accounts. The Gee/Kegl account predicts that a double argument stem will consist of the concatenation of the output of two number agreement templates: one applied to [TO Term LOC], the other applied to [LOC Term FROM]. The level ordering account involves two number agreement templates as well, but this time they are not concatenated but rather are nested one within the other. First, the stem [TO Term LOC] is mapped into a number agreement template -- singular, dual or plural. Then, at Level 2, a newly created stem containing within it the output of number agreement applied to [TO Term LOC] again feeds the rule of number agreement -- singular, dual or plural. The number agreement shows up on the head of this structure, namely, the source LOC.

Let's compare how these two analyses handle number agreement with respect to the sign GIVE (LOC1 WARD+FROM#TO+WARD LOC2). [15] We will begin with the forms predicted by the Gee and Kegl analysis. Below are the parallel word formation processes involved in the formation of the stems which will independently serve as input to the number agreement templates.

15. In the Gee and Kegl analysis of GIVE the terminators were labeled as AT instead of WARD. This distinction is irrelevant for our purposes.
STEM FORMATION: GIVE (Gee and Kegl Prediction)

TO__  ==>  TO+WARD__  ==>  TO+WARD LOC...
(RF)    (SF)

_FROM  ==>  _WARD+FROM  ==>  LOC WARD+FROM...
(RF)    (SF)

Figure 39.

These stems then independently feed the rule of number agreement, mapping into one of the following three templates:

NUMBER AGREEMENT TEMPLATES:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>singular</td>
<td>[ 'X₁' ]</td>
</tr>
<tr>
<td>dual</td>
<td>[ 'X₁' 'X₂' ]</td>
</tr>
<tr>
<td>plural</td>
<td>[ 'X₁' 'X₂' 'X₃' ]</td>
</tr>
</tbody>
</table>

Figure 40.

Below we list the output of number agreement for the singular, dual and plural forms of both the TO and the FROM stems:
OUTPUT OF NUMBER AGREEMENT:
----------------------------

TO-STEMS: [TO+WARD LOC]

------------------------

singular [TO+WARD LOC1]
dual [TO+WARD LOC1 TO+WARD LOCj]
plural [TO+WARD LOC1 TO+WARD LOCj TO+WARD LOCK]

FROM-STEMS: [LOC WARD+FROM]

------------------------

singular [LOC1 WARD+FROM]
dual [LOC1 WARD+FROM LOCj WARD+FROM]
plural [LOC1 WARD+FROM LOCj WARD+FROM LOCK WARD+FROM]

Figure 41.

These stems then feed the rule which concatenates a FROM stem and a TO stem. The following are the potential combinations which are predicted. The stars (*) indicate those combinations predicted by this formulation of the concatenation rule which turn out to be ungrammatical in ASL.
Aside from internal bracketing discrepancies, only the first three verbs correspond to possible surface strings in ASL. Sequences of FROM’s do not occur except in single argument stems.

The level ordering account much more accurately predicts the surface facts. It reflects an interesting asymmetry between stems with non-singular goals and stems with non-singular sources. Let’s examine how the level ordering analysis would account for the same set of GIVE-verbs.
At Level 1 the [TO WARD LOC] stem would involve rightward affixation as follows:

\[
[TO] \rightarrow [TO [WARD] \ ] \rightarrow [TO WARD [LOC] \ ] \ldots
\]
\[
X_b \ X_b \ (RF) \ X_r \ X_r \ X_r \ X_r \ (SF) \ X_s \ X_s \ X_s \ X_s
\]

**Figure 43.**

Unlike the Gee/Kegl account there is no formation of a FROM stem at this level. Still, like the previous approach, the output of stem formation, [TO WARD LOC], feeds number agreement yielding forms identical to the TO-forms produced in the Gee/Kegl approach:

<table>
<thead>
<tr>
<th>Singular</th>
<th>[TO WARD LOCi]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual</td>
<td>[TO WARD LOCi TO WARD LOCj]</td>
</tr>
<tr>
<td>Plural</td>
<td>[TO WARD LOCi TO WARD LOCj TO WARD LOCK]</td>
</tr>
</tbody>
</table>

**Figure 44.**

The stems produced at Level 1 are then present at Level 2 where the morpheme FROM, a base form, is introduced. At this level, affixation is leftward.

Since there are stems present at Level 2, the rule of base formation can apply. This rule compounds a base form and a stem. The only base form available is FROM and the only existent stems are TO-type stems. The rule can be stated simply as follows:

**BASE FORMATION:**

\[
-------------
\]
\[
X_b
\]
\[
X, X_b \rightarrow X_b X
\]

**Figure 45.**

Actually, Base Formation is one possible variant of the compounding
rule. There is no reason to stipulate any ordering restrictions with respect to the elements compounded by this rule. Either order can be freely generated. The reverse order yields stems that will eventually be realized as Negated TO-words. Negated FROM-words will be formed by this same compounding rule at Level 3 (the level at which Theme Association occurs). Evidence that Compounding occurs at this level as well comes from the fact that compounding must precede FROM-stem formation in order to get the complex two argument stems that occur in signs like GIVE and it must follow FROM-stem formation in order to get Negated FROM-words. Forms with the reverse ordering (base+stem) will be filtered out since there are no rules available at this level which can form stems from the resulting base forms. Thus, both Base Formation and the Negated Word Rule can be collapsed into the single Compounding rule stated below, a rule which need not make reference to ordering. The dominating node is left unlabeled since its value will be determined by which member of the compound ends up in the head position.

COMPOUNDING RULE:
---------------

\[
\begin{array}{ll}
/Xb, Xs \Rightarrow Xb \ Xs & \text{(mirror image)}
\end{array}
\]

Figure 46.

It might be pointed out that the pseudo-distinction between a rule of Base Formation and a Rule of Negative Suffixation is much akin to the pseudo-distinction between FROM and TO. The former are
two realizations of the compounding process. The latter are two realizations of the base form MOVE. Nonetheless, for purposes of clarity and expediency it is more convenient at the present time to refer to them by distinct names.

Returning to our discussion of Number Agreement and the sign GIVE, we can point out that Base Formation yields the following complex base forms, depending upon whether the stem it includes is singular, dual or plural.

\[
\text{BASE + STEM} \Rightarrow \text{BASE:}
\]

\[
[ \text{[FROM] [TO WARD LOC}] ]
\]
\[
\text{Xb Xb Xs Xs Xb Xb}
\]

\[
[ \text{[FROM] [TO WARD LOCj TO WARD LOC]} ]
\]
\[
\text{Xb Xb Xs Xs Xb Xb}
\]

\[
[ \text{[FROM] [TO WARD LOCj TO WARD LOCj TO WARD LOCK]} ]
\]
\[
\text{Xb Xb Xb Xs Xb}
\]

\text{Figure 47.}

We know the resulting structure is a base form for several reasons. First, it takes a terminator prefix to form a root:

\[
\text{TERMINATOR + BASE} \Rightarrow \text{ROOT:}
\]

\[
[ \text{[WARD] [FROM TO WARD LOC]} ]
\]
\[
\text{Xr Xb Xb Xr Xr}
\]

\[
[ \text{[WARD] [FROM TO WARD LOCj TO WARD LOC]} ]
\]
\[
\text{Xr Xb Xb Xr Xr}
\]

\[
[ \text{[WARD] [FROM TO WARD LOCj TO WARD LOCj TO WARD LOCK]} ]
\]
\[
\text{Xr Xb Xb Xr Xr}
\]

\text{Figure 48.}
This root in turn takes a LOC prefix to yield a stem:

\[
\text{ROOT + LOC} \Rightarrow \text{STEM:}
\]

\[
\begin{array}{cccc}
\text{Xs} & \text{Xr} & \text{Xb} & \text{Xb} \text{ Xr} \text{ Xs} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{Xs} & \text{Xr} & \text{Xb} & \text{Xb} \text{ Xr} \text{ Xs} \\
\end{array}
\]

\[
\begin{array}{cccc}
\text{Xs} & \text{Xr} & \text{Xb} & \text{Xb} \text{ Xr} \text{ Xs} \\
\end{array}
\]

\text{Figure 49.}

Now comes the difference. This entire stem now feeds the number agreement rule with some interesting results. In stems involving a singular source, although the bracketing differs, the rule produces a surface string identical to the string produced by the concatenation of two independent stems. Below we give the stems with singular sources and singular, dual and plural goals respectively. Underneath each form produced by the level ordering account we give the homophenous form produced by stem concatenation. The difference lies in the hierarchical structure assigned to each stem. Because a full labelled bracketing would be cumbersome to read, we present these examples in tree form. Since the TO-stem is internally the same in both accounts we will present it as a unit.
sg-GIVE-sg

---

a. (level ordering)

```
Xs
/\  
Xr / \  
Xb / \  
Xs / \  
Xr / \  
LOCI WARD FROM TO WARD LOCI
```

b. (Gee/Kegl: Concatenated Verb)

```
Xs
/ \  
/ \  
/ \  
/ \  
/ \  
LOCI WARD FROM TO WARD LOCI
```

Figure 50.
singular-GIVE-dual

---------------------

a. (level ordering)

```
  Xs
 /\  \
 /  Xr
/\  \
 /  Xb
 /\  \
/  Xs

LOC1 WARD FROM TO WARD LOC1 TO WARD LOCJ
```

b. (Gee/Kegl: Concatenated Verb)

```
  Xs
 /\  \
 /  Xr
/\  \
/  Xs

LOC1 WARD FROM TO WARD LOC1 TO WARD LOCJ
```

Figure 51.
In stems with a non-singular source, however, the surface strings predicted by the two accounts are not identical. In fact, only the level ordering account predicts the correct surface string. Below we list the surface strings for dual and plural sources. The first set are the surface strings predicted by the level ordering account. The second are those that were predicted by the Gee/Kegl account. We have omitted the redundant WARD-terminator affixes in an attempt to reduce the excessive length of these examples.
LEVEL ORDERING: DUAL SOURCES
-----------------------------

DUAL SOURCES:

a. singular goal
LOCi FROM TO LOCj LOCM FROM TO LOCi

b. dual goal
LOCi FROM TO LOCj LOCj LOCM FROM TO LOCi TO LOCj

c. plural goal
LOCi FROM TO LOCi TO LOCj TO LOCK LOCM FROM TO LOCi TO LOCj TO LOCK

Figure 53.

GEE/KEGL
--------

DUAL SOURCES:

a. singular goal
LOCi FROM LOCm FROM TO LOCi

b. dual goal
LOCi FROM LOCm FROM TO LOCi TO LOCj

c. plural goal
LOCi FROM LOCm FROM TO LOCi TO LOCj TO LOCK

Figure 54.
LEVEL ORDERING: PLURAL SOURCES
-----------------------------

PLURAL SOURCES:

a. singular goal

LOCi FROM TO LOCi LOCm FROM TO LOCi LOCn FROM TO LOCi

b. dual goal

LOCi FROM TO LOCi TO LOCj LOCm FROM TO LOCi TO LOCj LOCn FROM TO LOCi TO LOCj

Figure 55.

GEE/KEGL: PLURAL SOURCES
-------------------------

PLURAL SOURCES:

a. singular goal

LOCi FROM LOCm FROM LOCn FROM TO LOCi

b. dual goal

LOCi FROM LOCm FROM LOCn FROM TO LOCi TO LOCj

c. plural goal

LOCi FROM LOCm FROM LOCn FROM TO LOCi TO LOCj TO LOCK

Figure 56.

We will choose one example where the level ordering and the Gee/KeGL accounts predict differing surface strings to discuss in detail -- plural-GIVE-singular.
PREDICTIONS OF STEM FORM: plural-GIVE-singular
-----------------------------------------------

LEVEL ORDERING:
[ [LOC1 FROM TO LOC1] [LOCm FROM TO LOC1] [LOCn FROM TO LOC1] ]
Xs Xs Xs Xs Xs Xs Xs

GEE/KEGL:
* [ [ LOC1 FROM LOCm FROM LOCn FROM ] [ TO LOC1 ] ]
Xs Xs Xs Xs Xs Xs

Figure 57.

Each case of sub-bracketing in the two examples above is a viable
stem form in ASL:

EXAMPLES OF SUBBRACKETING:
-----------------------------

[LOC1 FROM TO LOC1]
[LOC1 FROM LOCm FROM LOCn FROM]
[TO LOC1]

Figure 58.

4. singular-GIVE-singular
--------------------------

LOC1 WARD+FROM+TO+WARD LOC1
  WARD LOC
    b-handling CL up

5. 'leave many locations by vehicle'

LOC1,m,n AT+FROM
3-classifier

[16]
6. 'person goes to a location'

\[
\text{TO LOC}\_1
\quad g\text{-classifier}
\]

Each of the verbs above exemplifies one of these possible stems. It is clear that the problem with the Gee/Kegl form of pl-GIVE-sg is tied to the formation of a double argument stem.

Why do we assume the verb GIVE to involve two movement base forms in the first place? Our evidence comes from the physical realization of the verb sg-GIVE-pl which has the surface form:

\[
\text{SURFACE FROM OF singular-GIVE-plural:}
\]

\[
\text{LOC}\_1 \text{WARD+FROM+TO LOC}_j \text{WARD+TO LOCK WARD+TO LOC}\_1
\]

\text{Figure 59.}

It is physically realized by a movement of the hand from a position near the signer's body to each of three positions away from the signer's body. After the first movement to a position away from the body, the subsequent movements are short movements to the remaining two locations, but never return to the initial starting point near the signer's body. An illustration of the pattern of movement is given below:

16. This is a shorthand representation for a sequence of three stems which are the output of mapping the stem LOC AT+FROM into a plural number agreement template.
MOVEMENT PATTERN: singular-GIVE-plural

(signer's body)

Figure 60.

We schematize this as follows:

SCHEMATIC REPRESENTATION OF MOVEMENT PATTERN: sg.-GIVE-pl.

FROM | TO

'one person gives to many people'

Figure 61.

In Gee and Kegl (1982 a,b), we wrongly claimed that the plural-GIVE-singular form was the mirror image of the above form as below:
INCORRECT SCHEMA: plural-GIVE-singular

* LOCj FROM LOCK FROM LOC1 FROM TO LOC1

Figure 62.

This unfortunately is not the case. There is a form of the plural-GIVE-singular verb which looks somewhat like this, but it is a contraction of plural-GIVE-singular with a plural pronoun. It has the following form:

SCHEMA OF CONTRACTED FORM: singular-GIVE-plural

Figure 63.
Contraction is a phonological process which realizes the movement of a verb at the location of a cliticized pronominal form. The details of contraction are addressed Kegl and Philip (in preparation).

**CONTRACTION FORM: 'you sg. give to me'**

```
(\text{TO+AT LOC1} \text{ LOC1 WARD+FROM+TO+WARD LOCj} \Rightarrow \text{TO+AT LOCi\#AT LOC1})
```

\text{g-classifier} \quad \text{ON LOC} \quad \text{LOCi WARD+FROM+TO+WARD LOCj}

\text{b-handling CL} \quad \text{WARD LOC} \quad \text{b-handling CL up}

\hline
\text{YOU} \quad \text{YOU-GIVE-ME} \quad \text{YOU-GIVE-ME}
\hline
\text{full form} \quad \text{contracted form}

\begin{tabular}{c}
\text{(i=2nd per.; j=1st per.)} \\
\end{tabular}

**Figure 64.**

This restricts the FROM-TO movement of GIVE to being realized by a wrist movement at location i.

The non-contracted form of the pl-GIVE-sg verb has the following pattern supporting the level ordering analysis:
NON-CONTRACTED FORM: plural-GIVE-singular

[ LOCi FROM TO LOCj FROM TO LOCk FROM TO LOCj ]

In the articulation of this form of the verb the hand moves fully between each source position and the goal in a series of three gestures. The goal stem (TO LOCj), although singular, is repeated three times. Number agreement for the source has scope over the entire stem, whereas number agreement for the goal has scope only over the lower stem. This is further support for the hierarchical representation characteristic of the level ordering approach. This is an assymetry which cannot be accounted for if we assume simple stem concatenation.

There are several other reasons to favor the level ordering account. The lexical stipulation of LOC position or the use of a ML-template, such as the one mentioned at the beginning of the chapter, only weakly aids us in predicting the position of the terminator and LOC affixes. We can use the ML-template to simplify
the Root Formation rule as follows:

\[
\begin{array}{c|c}
\text{MOVE} & \text{TERM} \\
M & L \\
\end{array}
\]

(Mirror Image)

Figure 66.

However, we still need to stipulate that the terminator attaches on the L side versus the non-L side. There is no independent principle precluding the following equally likely rule:

\[
\begin{array}{c|c}
\text{TERM} & \text{MOVE} \\
M & L \\
\end{array}
\]

Figure 67.

The template would merely gives us a way to distinguish TO and FROM; it has no predictive power. The template functions as a diacritic in the Stem Formation Rule. It indicates from the beginning of the derivation on which side of the verb the LOC will appear. There is nothing in the ML-template which predicts the order in which the two verbs which comprise a double argument stem are to be concatenated.
POSSIBLE ORDERINGS OF MOTION STEMS:
---------------------------------------

# Xs
   \
   \  
   \  
   \  
   \  
   \  
   \  
   \  
   \  
   Xs  Xs
   / \ / \  
  / \ / \  
 / \ / \  
/ \ / \  
TO TERM LOC1 LOCj TERM FROM

versus

Xs
   \
   \  
   \  
   \  
   \  
   \  
   \  
   \  
   \  
   \  
   \  
   \  
Xs
   / \ / \  
  / \ / \  
 / \ / \  
/ \ / \  
LOCj TERM FROM TO TERM LOC1

Figure 68.

Some stipulation must be added to the concatenation rule such as FROM stems precede TO stems or stems concatenate on their non-LOC side. The ordering of affixes associated with Level 1 and Level 2 in the level ordering account not only predicts the affixation position of terminators and LOC but also predicts where the FROM appears in Base Formation. Being a Level 2 rule whose output is a base form indicates that the FROM must be on the left.
If we look closer at the process of number agreement and the indexing of LOCs we find support for a level ordered approach here as well. Number Agreement involves the mapping of a stem into a singular, dual or plural template in which each stem position gets an index. The index assigned to the stem as a whole gets transmitted to its LOC. Remember that LOC is the head of this stem. Therefore, we have a situation where some feature (an index) assigned to some constituent can be transmitted to the head of that constituent.

TRANSMISSION OF INDEX TO HEAD OF STEM (percolation):
-----------------------------------------------

\[ \begin{align*}
[Xs]_i &\quad \quad [Xs]_i \\
/\ &\Rightarrow \quad /\ \\
Xr &\quad LOC \\
/\ &\quad /\ \\
TO &\quad AT \\
(\text{head}) &\quad TO \quad AT
\end{align*} \]

Figure 69.

Now consider a double argument structure form. At Level 1 a rule of number agreement assigns an index or a series of indices to the stem.

INDEX ASSIGNMENT TO SIMPLE STEM:
----------------------------------

\[ \begin{align*}
[TO \ AT \ LOC]_i \\
\end{align*} \]

Figure 70.

At Level 2 number agreement again applies to a complex stem containing this already indexed stem.
INDEX ASSIGNMENT TO COMPLEX STEM:
-------------------------------------

[LOC AT FROM [TO AT LOC]i]j

Figure 71.

When we index this entire stem, only the LOC previously unindexed receives the j index. There is no conflict with the previously indexed LOC nor is this index reassigned. Of course, if we recognize only the unindexed LOC to be the head of this 'X (stem), we can account for why only this element receives the index.

HEAD RELATIONS IN COMPLEX STEMS:
-------------------------------------

\[
\begin{array}{c}
\text{LOCj T FROM TO T LOCi} \\
\text{[ head ]}
\end{array}
\]

Figure 72.

One final argument which favors the level ordering account concerns c-command. There is an interesting restriction internal to lexical items which prohibits the co-indexing of sources and goals: LOCi T+FROM#TO+T LOCi. Such a restriction can be made to follow from c-command only if we adopt the non-concatenated representation predicted by level ordering. We will assume here the traditional definition of c-command attributed to Reinhart.
X c-commands Y iff the first branching node dominating X dominates Y, and X does not dominate Y, nor Y, X.

Below are the two structures predicted by the Gee and Kegl account (Figure (a)) and the Level Ordering account (Figure (b)):
WORD INTERNAL INDEXING FILTER:
----------------------------------

* [...LOC1...LOC1...]
  \   \  
  W   W

Figure 74.

This is overly powerful. It will not only rule out the co-indexing of source and goal, but also will rule out all dual and plural verb forms. Consider the following example:

GEE/KEGL APPROACH:
-------------------

```
    Xs
   / \ \\
  Xs  Xs
 / \ / \ \\
[Xs]i [XS]j [Xs]k [Xs]l
 / \ / \ / \ \\
LOC1 FROM LOCj FROM LOCK FROM TO LOC1
```

Figure 75.
LEVEL ORDERING APPROACH:

---

Figure 76.

First of all, the Gee/Kegl approach predicts the wrong form altogether. However, even if we try to apply this more general restriction to the representation typical of the level ordering approach, we see it is too powerful. The perfectly grammatical structure given above would be ruled out because of the three co-indexed LOCs. Notice, however, that these LOCs, although co-indexed, do not c-command each other. Therefore, although number agreement yields a structure with multiple co-indexed LOCs, the structure is perfectly acceptable. In summary, a c-command relation holds between the following sets of constituents:
CONSTITUENTS INVOLVED IN A C-COMMAND RELATION:

\[
\begin{array}{ll}
\text{LOC}_i-\text{LOC}_i & [Xs]_i-[Xs]_j \\
\text{LOC}_j-\text{LOC}_i & [Xs]_j-[Xs]_k \\
\text{LOC}_k-\text{LOC}_i & [Xs]_k-[Xs]_l \\
\end{array}
\]

Figure 77.

But, no relation holds between \text{LOC}_i and a second instance of \text{LOC}_i.

A post-lexical rule of aspectual reduplication also produces multiple co-indexed \text{LOC}s. This rule reduplicates a fully formed word to mark such aspectual distinctions as continual aspect, frequentative aspect, etc.. This rule results in a structure in which these co-indexed \text{LOC}s are not involved in a c-command relation. Therefore, co-indexation is not prohibited.

ASPECTUAL REDUPLICATION:

\[
\begin{array}{c}
X \Rightarrow [X X] \\
X \quad X
\end{array}
\]

Figure 78.
EXAMPLE ILLUSTRATING ASPECTUAL REDUPLICATION:

\[
\begin{array}{c}
[ [Xs] ] \text{[reduplicated]} \\
X \backslash X \\
\end{array}
\]

\[
\begin{array}{c}
[ [Xs]i ] \\
\text{Xbase} \\
\end{array}
\quad \quad 
\begin{array}{c}
[ [Xs]i ] \\
\text{Xbase} \\
\end{array}
\]

\[
\begin{array}{c}
[ [Xs]j ] \\
\text{Xbase} \\
\end{array}
\quad \quad 
\begin{array}{c}
[ [Xs]j ] \\
\text{Xbase} \\
\end{array}
\]

\[
\begin{array}{c}
[\text{LOCi FROM TO LOCj}] \implies [ [\text{LOCi FROM TO LOCj}] [\text{LOCi FROM TO LOCj}] ] \\
X \quad X \quad X \quad X \quad X \quad X \\
\end{array}
\]

\[
\begin{array}{c}
\text{WARD LOC} \\
\text{b-handling CL up} \\
\end{array}
\quad \quad 
\begin{array}{c}
\text{WARD LOC} \\
\text{b-handling CL up} \\
\end{array}
\quad \quad 
\begin{array}{c}
\text{WARD LOC} \\
\text{b-handling CL up} \\
\end{array}
\]

'person sg. continually gives to person sg.'

Figure 79.

4.1.2.3 Summary Discussion -

In this section we examined two accounts of word formation in ASL: the Gee/Kegl Approach and the Level Ordering Approach. We rejected the Gee/Kegl Approach in favor of the Level Ordering Approach, pointing out that although both approaches adequately account for the formation of simple stems, only the Level Ordering Approach predicts the correct surface forms resulting from interactions of Base Formation, number agreement and aspectual reduplication.
4.1.2.3.1 C-Command In Lexical Representations -

The structure of complex two argument stems (i.e., FROM+TO stems) must be seen as right branching where the affixes added after the initial formation of a TO-type stem (i.e., FROM, its terminator and its LOC) c-command this lower stem. The non-level ordering approach wrongly predicts that complex two argument stems involve the compounding of two independently formed stems (i.e., LOC+TERM+FROM and TO+TERM+LOC). Crucially, in such a configuration the source LOC does not c-command the goal LOC. We presented empirical evidence which favors the representation involving c-command over the one which does not. The two main arguments are summarized below:

1. A structure involving c-command suggests that there should be evidence of scope distinctions. A scope asymmetry was shown to exist between verbs like sg-GIVE-pl vs. pl-GIVE-sg. In the latter case, plural number agreement on the source (the constituent with wider scope) forces a de facto "pluralization" of the goal -- i.e., even though singular, this goal is triply articulated. Each of the goal LOCs, however, retains its original index assigned by number agreement on the lower verb. A plural goal, as expected, does not have a similar "pluralizing" effect on its singular source since the goal has narrower scope than the source.
2. A prohibition against the co-indexing of sources and goals was shown to follow from c-command. Namely, a LOC may not be co-indexed with another LOC which c-commands it. Such a c-command relation holds only in the right branching representation predicted by the Level Ordering Approach. Furthermore, a co-indexing restriction stated in terms of c-command was shown to be preferable over a more general filter prohibiting word internal co-indexed LOCs. The output of both number agreement and aspectual reduplication were shown to produce perfectly allowable instances of word internal co-indexed LOCs. In all of these allowable cases, the co-indexed LOCs did not stand in a c-command relation with one another.

4.1.2.3.2 Lexically Specified Reference To Head Position -

The Level Ordering, the ML-Template and the Gee/Kegl Approaches all involve lexical specifications which distinguish FROM roots from TO roots. The ML-Template Approach involved linking the base form MOVE to two different ML-Templates (LM vs. ML). The Gee/Kegl Approach involved specifying LOC position in the lexical entries for the base forms (TO, FROM, IN, ON, AT, WARD). The Level Ordering Approach lexically specified the levels at which TO and FROM are introduced and, furthermore, distinguished these levels by the position at which the head appears: Level 1 = head final and Level 2 = head initial. Evidence for one approach over the other involved arguments concerning whether or not generalizations
concerning the ordering of elements internal to an ASL word are best stated in terms of some morphophonological properties involving sequences of (M)ovements and (L)ocations or are better stated in terms of lexically determined head-complement relations. Again, although all the approaches could adequately handle the simple cases, in the more complex examples ordering generalizations were best stated in terms of level ordering and head-complement relations. The two pieces of evidence which were brought to bear on this issue are summarized below:

1. The ordering of FROM in a complex stem follows from the fact that it is a Level 2 morpheme which serves as an head in the rule of base formation. Being attached at Level 2, and given that heads determine the value of the dominating node, the Level Ordering Approach predicts that FROM will be to the left of TO. On the other hand, although the positions of Terminators and LOCs can be predicted by some lexical specification of the TO and FROM roots in terms of association with an ML-Template, this underlying specification cannot be extended to predict the order in which the TO and FROM type verbs will be concatenated in complex verbs. An ad hoc stipulation must be made that FROM verbs attach to the left of TO verbs. Even the ordering of terminators with respect to the movement roots requires an added stipulation. We must state that the terminator attaches to the same side of the root as the L slot appears. Attachment of the terminator to the opposite side seems an equally plausible stipulation. The
Level Ordering Approach which lexically specifies head positions at Level 1 and Level 2 and associates TO with Level 1 and FROM with Level 2 predicts the ordering of not only the Terminators and LOCs, but the ordering of the FROM base in complex verbs as well. Furthermore, it does so without the use of a preassociated ML-Template as a diacritic.

2. The second piece of evidence made use of the fact that the index assigned to a stem by number agreement is transmitted to the head of the indexed stem (i.e., the LOC). In the case of complex stems, indexing of the goal LOC was shown to apply prior to indexing of the source LOC. In other words, number agreement applies to the lower stem (the TO-type stem) before it applies to the complex stem as a whole. When number agreement applies to the complex stem as a whole, only the source LOC receives the index. This is evidence that the source LOC alone is the head of the complex stem. This also accounts for why the indexing of goal LOCs occurs prior to the indexing of source LOCs. It is only prior to base formation that the goal LOC is the head of the stem.

4.2 TWO REMAINING ISSUES

Up to now we have not systematically used the X-bar system in our representations of the internal structure of ASL signs, although we have distinguished these various levels by referring to bases (''X), roots (''X), stems ('X) and words (X). Before we conclude with an overview of how this category
neutral, level ordered X-bar account of the ASL lexicon is organized, two issues need to be cleared up: 1) the status of the distinction between FROM and TO, and 2) the nature of the classifier "affix" and the level of its attachment. This discussion will be accompanied by a final summary of the level-ordered X-bar account of word formation rules in ASL.

4.2.1 The FROM Vs. TO Distinction

The first issue to be addressed concerns whether FROM and TO can be treated as a single base form: MOVE. There are numerous reasons why collapsing these two base forms makes a lot of sense. The first motivation comes from the analysis of Negated Verbs. Unless we assume the suffix of Negated verbs to be the single base form MOVE, two separate, suspiciously similar, rules will be needed. Not only is the environment of these two rules highly similar, but the co-occurrence between positive vs. negative suffixes and the base movement are completely predictable. If the stem movement is TO, the Negator suffix is FROM; and vice versa.
COMPONDING STRUCTURE FOR NEGATED VERBS:
------------------------------------------

TO-STEM + FROM-BASE:
---------------------

  STEM
  /\ 
  / \ 
[STEM]i BASE
/\ | 
ROOT LOC FROM
/\ 
BASE TERMINATOR
| 
TO

Figure 80.

FROM-STEM + TO-BASE:
---------------------

  STEM
  /\ 
  / \ 
[STEM]i BASE
/\ | 
LOC ROOT TO
/\ 
TERMINATOR BASE
| 
FROM

Figure 81.

If we know the value of one base form, we can predict the value of the other. But, if the base is MOVE in both instances, how do we determine which is which. The answer obviously lies in determining the value of the base form in the stem. The value of the negator base morpheme of Negated verbs will follow from the Thematic Coherence Principle which disallows the co-occurrence of two like theta-roles within a given word. In fact, the base form in the Base Formation Rule
is equally predictable.

Base Formation may actually give us some insight as to how a single base form MOVE can be motivated. Notice that the base form which compounds with a stem in Base Formation always has the value FROM; and the value in the stem is always TO.

**COMPOUNDING STRUCTURE FOR BASE FORMATION:**

```
BASE
  /
 BASE [STEM]i
  /
 FROM ROOT LOC
 /
 BASE TERMINATOR
 |
 TO
```

Figure 82.

In TO-stems, the terminator and LOC follow the base form. At Level 1 all affixes are final, because heads are final and affixes are obligatory heads. From this it follows that even if we assume an independent FROM movement to be available at Level 1, it can never get its affixes in the right position.

The same holds for the formation of FROM-stems at Level 2. At Level 2, all affixes are initial, because heads are initial and affixes are heads. Again, even if an independent TO base form were present at Level 2, it could never get its affixes attached in the right place.
Of course, if we assume TO and FROM to occur at both levels, we would need some way to prevent or filter out the formation of unacceptable strings like *LOC Terminator+TO or *FROM+Terminator LOC. The answer lies in allowing the position of the affix to determine the value of the movement instead of allowing the value of the movement to determine where the LOC will be attached. The position of the affixes determines the value (FROM vs. TO) of the neutral movement morpheme MOVE.

In the same way that knowing the base form allows us to predict the compounded base form in either Base Formation or Negative Suffixation, the combination MOVE+affix is interpreted as TO+affix and the combination affix+MOVE is interpreted as affix+FROM. The interpretation falls out from the ordering of the base and affix; and the ordering of the base and affix falls out from the Level at which they are attached. Thus, if we assume a single base form MOVE, combinations at Level 1 (head final) and Level 2 (head initial) will automatically give us the TO vs. FROM distinction for free. The interpretation of bases added subsequently will follow from the Thematic Coherence Principle: the MOVE added to a MOVE+affix stem will be interpreted as FROM (whether it precedes or follows) and the MOVE added to an affix+MOVE stem will be interpreted as a TO for the same reason. This rids us of any ad hoc stipulation that TO only occurs at Level 1 and FROM only occurs at Level 2 which is forced upon us if we assume the two bases are distinct. Instead, MOVE, like all the other formatives is present at both levels. Only the statement concerning head
position differs.

A second problem is also resolved by assuming the base form to be the neutral form MDVE. This concerns whether the Thematic Coherence Principle will really rule out the occurrence of two T0s in Negative Suffixation forms. The problem arises because in such forms two independent bases each assign a theta-role to the same LOC. Such a situation is perfectly allowable given the statement of the Theta-Criterion in Chapter 6 of LGB (Chomsky (1981:335); see Chapter 1 of this thesis for the exact formulation of this rule). This allows sentences like Mary kicked Sue into the bedroom, where Sue is the goal of kicked and the theme of into the bedroom. Basically, if we assume theta-role assignment to be a property of chains and we assume theta-role assignment to occur word internally (parallel to theta-role assignment internal to a syntactic idiom); then, if a single LOC is a member of two separate chains, it has the possibility of receiving two theta-roles. This is the situation which arises in Negated Verbs.

In Figures (a) and (b) below we can see that there is only one LOC, but two theta-role assigning bases. First we will consider where the two bases are distinct (namely, FROM and TO).
THETA-ROLE ASSIGNMENT IN FORMS INVOLVING NEGATIVE SUFFIXATION:
---------------------------------------------------------------

TO-STEM + FROM-BASE:
-----------------------

STEM
     /
    /  
   [STEM]i BASE
      /
     ROOT LOC   FROM
    /
BASE TERMINATOR
  |
TO

Figure 83a.

FROM-STEM + TO-BASE:
-----------------------

STEM
     /
    /  
   [STEM]i BASE
      /
     LOC ROOT  TO
    /
TERMINATOR BASE
  |
FROM

Figure 83b.

Up to now we have assumed that the Thematic Coherence Principle will rule out Negative Suffixation forms with two like movements. Whether this is actually the case, is debatable. Consider an unacceptable form involving two like TO bases as schematized in the Figure below:
NEGATIVE SUFFIXATION FORM WITH TWO LIKE BASE FORMS:
-----------------------------------------------

* TO-STEM + TO-BASE:

-------------------

STEM
\ /\ /
[STEM]i BASE
\ / |
ROOT LOC TO
\ / BASE TERMINATOR
| TO

Figure 84.

Suppose again that the TO and FROM base forms are distinct lexical formatives, not differing interpretations of the same base form MOVE. With this in mind consider the nature of the Thematic Coherence Principle. If the Thematic Coherence Principle is stated in terms of two like theta-roles occurring in a single word, then it will not exclude ungrammatical structures such as the one above. The above structure, which also, by the way, obeys the Theta-Criterion, has two different theta-roles assigned to the same LOC as the result of two separate theta-role assignment chains. In order to exclude this form, we would have to state the Thematic Coherence Principle in terms of theta-role assigners rather than theta-roles. The consequences and complications of such a revision quickly become unmanageable for any language which unlike ASL has more than two theta-role assigners.
However, if we return to our assumption that TO and FROM are reflexes of the same base form MOVE and view the Thematic Coherence Principle also as a matter of interpretation, we get exactly the right results. If the base form precedes its terminator, the base form is interpreted as a TO; and, consequently, the theta-role it assigns to the LOC is interpreted as goal. If the base form in the stem is interpreted as a TO, the base form added by Negative Suffixation, by virtue of the Thematic Coherence Principle is interpreted as a FROM. Consequently, the theta-role it assigns to the same LOC is this time taken to be a goal. Thus, no violation of either the Theta-Criterion or the Thematic Coherence Principle occurs. With MOVE as the base forms and theta-role assignment as a matter of interpretation, the situation will never arise where an ungrammatical structure such as the one above will exist. Therefore, we conclude that what we think of as TO and FROM must be one in the same base form, the neutral base form MOVE. This reduces the inventory of possible formative elements in ASL and further supports the Locative Hypothesis since it places pure movement at the heart of ASL grammar. This movement co-occurs with a pure locational element, LOC, whose role as source, goal or location is also a secondary matter of interpretation.

The simple mechanisms we have proposed--1) head position as a function of lexical level of attachment, and 2) The Thematic Coherence Principle--give us the interpretation of MOVE for free. With this in mind, let us review the proposed
level ordering account, this time stated in terms of a category neutral X-bar representation.

Signs are presumed to have an internal structure statable in X-bar terms. The movement base is the minimal projection of the lexicon ("'X") and the word is the maximal projection (X). [17] See the diagram below:

X-BAR RELATIONS IN THE LEXICON AND SYNTAX:
---------------------------------------------

"'X 'X 'X maxXmin 'X' 'X'

Figure 85.

There are three types of lexical formatives: 1) the non-affixes: the base form: MOVE ("'X"); roots: "'X+"Xaf (X'"); stems: "'X+'X-aff (X) and words: 'X+'X-aff (X); 2) affixes: terminators: IN, ON, AT, WARD ("'X-aff"); the locative argument marker: LOC ("'X-aff") and the classifier affixes (classifiers, nouns, gerunds): rimmed-object classifier, long thin object classifier, handling classifiers, etc. ("X-aff") and 3) the number agreement templates: singular ['X', dual ['X'[X], plural ['X'+X'Xk] and the aspectual reduplication template: durative aspect, iterative aspect,

17. The issue of what constitutes the maximal projection is a bit complicated. We will address this issue in Chapter 5 with respect to our investigation of a syntactic process of Noun Incorporation which incorporates an X (minus its motion/location complement) into the classifier affix position of a verb. In that discussion we will consider the possibility that it is ('X; i.e., the stem) and not X which serves as the maximal projection of the lexicon. For the moment, we will ignore this issue.
etc. \([\text{X}_i \text{X}_i]\). For convenience they are listed below with information concerning whether they are headed or headless, and whether or not they can serve as heads:

**TYPES OF LEXICAL FORMATIVES:**

------------------------

I. **NON-AFFIXES**

--------

\(
\begin{array}{ccc}
\text{"""X} & \text{base form} & \text{MOVE} \\
\text{"X} & \text{root} & \text{[base+terminator]} \\
\text{'X} & \text{stem} & \text{[root+LOC]} \\
\text{(X)} & \text{word} & \text{[stem+classifier]} \\
\end{array}
\)

---

may or may not serve as heads

II. **AFFIXES:**

--------

\(
\begin{array}{l}
\text{"""X-af} & \text{Terminators: IN, ON, AT, WARD} \\
\text{""X-af} & \text{Locative Argument Marker: LOC} \\
\text{'X-af} & \text{Classifier Affixes: x-CL, noun, gerund} \\
\end{array}
\)

---

must be the head

III. **TEMPLATES:**

--------

\(
\begin{array}{l}
\text{'X} & \text{Number agreement: \[\text{'X}_i\] sg.} \\
\text{[\text{'X}_i \text{'X}_j]} & \text{[\text{dual}]} \\
\text{[\text{'X}_i \text{'X}_j \text{'X}_k]} & \text{pl. headless} \\
\text{X} & \text{Aspectual Reduplication: \[\text{X}_i \text{X}_i\]} \\
\end{array}
\)

---

**Figure 86.**

There are two types of morphological processes: headed and headless. Mapping into templates is a headless morphological process. The output of such a process is equal to the value of the input. Affixation and Compounding are both headed morphological processes. They differ in terms of whether they cause an increment in the bar level of the node which dominated them.
Affixation involves the addition of an affix which obligatorily appears in head position. In such combinations the dominating node is always incremented one bar level.

In Compounding, neither formative is an obligatory head; thus, neither must appear in head position and their ordering is free. The level at which the compounding occurs determines which formative is in head position. The formative in this position determines the value of the dominating node, but with no increment in bar level. There is not only a compounding rule which combines bases and stems, but another, later rule which compounds two words. The resulting forms are the types of compounds discussed at the end of Chapter 3.

Finally, we come to the stipulation of head position which is a function of level of attachment. Ordering will either be free or fall out from the restriction that affixes must be heads, and therefore must appear in head position.

STATEMENTS OF HEAD POSITION:
-----------------------------
Level 1: head final
Level 2: head initial

Figure 87.

As a result, affixation at level 1 will always be suffixation and affixation at level 2 will always be prefixation. The interesting thing about ASL lies in the utter simplicity exhibited by its word formation rules and the fact that the unmarked case seems to involves the exact same affixes at each
level; functioning one time as suffixes and another time as prefixes.

Before we turn our attention to the characteristics of a possible third level and the role played by the classifier affixes, let's consider several representative illustrations of word formation at levels 1 and 2. Remember that viewing these structures in a derivational fashion is just a metaphor used to describe the dominance and precedence relations pertinent to word structure.
FORMATION OF NON-COMPLEX TO-STEM:

---

Level 1: head final

\[
\text{MOVE, TERM} \rightarrow \begin{array}{l}
\quad \text{''X} \quad \text{[TO+AT]} \\
\quad \quad \text{\textbackslash head} \\
\quad \quad \text{''''X ''''X-af} \\
\quad \quad \quad \text{\textvert} \\
\quad \quad \text{\textvert} \\
\quad \quad \text{MOVE TERM} \\
\end{array}
\]

\[
\text{(MOVE, TERM), LOC} \rightarrow \begin{array}{l}
\quad \text{'X} \quad \text{[TO+AT LOC]} \\
\quad \quad \text{\textbackslash head} \\
\quad \quad \text{'''X-af} \\
\quad \quad \quad \text{\textvert} \\
\quad \quad \text{\textvert} \\
\quad \quad \text{''X LOC} \\
\quad \quad \quad \text{\textbackslash head} \\
\quad \quad \quad \text{''''X ''''X-af} \\
\quad \quad \quad \quad \text{\textvert} \\
\quad \quad \quad \quad \text{\textvert} \\
\quad \quad \quad \text{MOVE TERM} \\
\end{array}
\]

NUMBER AGREEMENT: \rightarrow \begin{array}{l}
\quad \text{['X]i} \quad \text{[TO+AT LOC]i} \\
\quad \quad \text{\textbackslash head} \\
\quad \quad \text{'''X-af} \\
\quad \quad \quad \text{\textvert} \\
\quad \quad \text{\textvert} \\
\quad \quad \text{''X LOC} \\
\quad \quad \quad \text{\textbackslash head} \\
\quad \quad \quad \text{''''X ''''X-af} \\
\quad \quad \quad \quad \text{\textvert} \\
\quad \quad \quad \quad \text{\textvert} \\
\quad \quad \quad \text{MOVE TERM} \\
\end{array}
\]

INDEX TRANSMISSION: \rightarrow \begin{array}{l}
\quad \text{['X]i} \quad \text{[TO+AT LOCi]i} \\
\quad \quad \text{\textbackslash head} \\
\quad \quad \text{'''X-af} \\
\quad \quad \quad \text{\textvert} \\
\quad \quad \text{\textvert} \\
\quad \quad \text{''X LOCi} \\
\quad \quad \quad \text{\textbackslash head} \\
\quad \quad \quad \text{''''X ''''X-af} \\
\quad \quad \quad \quad \text{\textvert} \\
\quad \quad \quad \quad \text{\textvert} \\
\quad \quad \quad \text{MOVE TERM} \\
\end{array}
\]

Figure 88.

---

18. Hereafter, the number agreement and index transmission representations will be collapsed into one representation.
FORMATION OF NON-COMPLEX FROM-STEM:
----------------------------------------

Level 2: head initial

MOVE, TERM ==> "'X [AT+FROM]
               \ head
               "'X-af "'X
               |   |
               TERM MOVE

(MOVE, TERM), LOC ==> 'X [AT+FROM LOC]
               \ head
               "'X-af \ 
               |   "'X
               LOC /\ head
               "'X-af "'X
               |   |
               TERM MOVE

NUMBER AGREEMENT: ==> ['X]i [AT+FROM LOCi]i
and INDEX TRANSMISSION

Figure 89.

COMPLEX STEM FORMATION (compounding):
----------------------------------------

MOVE, ['X]i ==> "'X [FROM#$TO+WARD LOCj]j

['X]i = output of
TO-STEM FORMATION

head /\ 
"'X [FROM#$TO+WARD LOCj]j
   /\ head
   / [X]i
   / "'X-af
   \ | MOVE / |
   "'X LOCi
   \ \ head
   "'X "'X-af
   |   |
   MOVE TERM

Figure 90a.
(MOVE, ['X1]), TERM =>  'X  [WARD+FROM#TO+WARD LOCj]

\/
\  
'X-af  'X
|  head/\  
TERM  / ['X]i
  'X  \  head
   /  'X-af
MOVE /  |
  'X  LOCi
\  head
'X  'X-af
|  |
MOVE  TERM

Figure 90b.

(MOVE, ['X1]), TERM), LOC =>  'X  [LOC WARD+FROM#TO+WARD LOCj]

head/\  
/  
'X-af  'X
|  head/\  
LOC  /  
'X-af  'X
|  head/\  
TERM  / ['X]i
  'X  \  head
   /  'X-af
MOVE /  |
  'X  LOCi
\  head
'X  'X-af
|  |
MOVE  TERM

Figure 90c.
NUMBER AGREEMENT  

AND INDEX TRANSMISSION

Figure 90d.

FORMATION OF NEGATED WORD FROM TO-STEM (compounding):

Figure 91.
FORMATION OF NEGATED WORD FROM FROM-STEM:

\[ MOVE, ['X'] \rightarrow ['X'] [[LOCi ON+FROM] TO] \]
\[ \backslash / X \]
\[ ['X'] \]
\[ X=af \]
\[ \backslash \head \] MOVE
\[ ''X=af ''X \]
\[ \backslash \head \] LOCi
\[ ''''X=af ''''X \]
\[ \\ | \ ]
TERM MOVE

Figure 92.

4.2.2 The Position Of The Classifier Affix

The final issue to be considered concerns properties of the classifier affix. It comes down to two questions. The first concerns statements of head position and their typological possibilities. The second concerns the nature of a maximal projection in the ASL lexicon and whether the word vs. word stem is the most likely candidate for this position. We will concern ourselves here with the first question and will return to the second question in Chapter 5.

The final step in the process of ASL word formation involves a rule or Theme Association which inserts a classifier, noun or gerund into the theme position of the stem yielding the lexical item we call a sign. This process is represented in schematic terms below:
THEME ASSOCIATION:

\[ \text{M} \rightarrow \text{T LOC1} \quad \rightarrow \quad \text{M} \rightarrow \text{T LOC1} \quad \text{THEME} \]

Figure 93.

The theme is realized by a handshape alone; or, in more complicated examples, by an entire motion/location string that may have embedded within it other motion/location strings and eventually a theme consisting only of a classifier. This theme is articulated simultaneously with the matrix string. In other words, in its surface realization it is unordered with respect to its complement. Is there a third level stipulated as "head unordered" or is the position of the classifier affix with respect to its complement attributable to its phonetic make-up?

The lack of ordering which is characteristic of themes is particularly remarkable since such a relation goes well with the interpretation associated with the element bearing the thematic role, theme. A theme is that element which moves with respect to a verb of motion or is located with respect to a verb of location. It is inherently tied to the moving or locating event rather than serving as an anchor point for these relations in the way that sources and goals do. The heart of ASL is movement and location. In fact, signers often play upon the fact that most of the message is available without any distinctions in handshape by playing language games where all the theme positions in a word are reduced to a single neutral handshape or even a particular handshape chosen for the
purposes of the game. Surprisingly, very little comprehension is sacrificed in such a situation. Also, in acquisition, children seem to master entire motion location system before they have even begun to tackle themes: simple or complex. They start out substituting an index finger or a flat hand in all theme positions while articulating some fairly complex movement patterns (see Kantor (1977, 1980, 1982).

In the articulation of the sign, which involves primarily gross motor movements of the arms and body, there is an open channel—the internal configuration of the hand. Because it is so readily available, it gets used. But, it also follows that for the handshape to be articulated, the hand and arm must be located or moving in space.

The most likely function for the handshape is to mark the theme. It's a natural. Thus, we find in ASL an elaborate classifier system [19], where every lexical item contains some classifier which marks a theme. This is true not only of nouns and verbs, but of adjectives and the clitics as well. There isn't much of a prepositional system in ASL. With the extent to which the grammar is spatially based, it is no wonder.

We will begin by considering the simplest type of theme, the simple classifier. A classifier which is not part of a more complex theme consists solely of a handshape. As noted above, handshape cannot be realized alone. It must be realized

in space—either moving or located. Thus, in much the way that a tone depends upon a vowel to be realized, handshape is dependant upon movement. Actually, the dependancy is mutual.

It is from this dependancy between handshapes and movements that the head unordered property of the classifier affix may have arisen. But this is certainly no longer the only motivation for this relationship. Although the position of the classifier may have its basis in phonetic necessity or semantic perspicuity, this initial ordering relation has been reanalyzed in a totally structural sense. Whole gerunds and nouns which contain within them movements and LOCs can also be realized concurrently with the matrix movement. Has a phonetically based characteristic been extended to an entire morphological class of forms or is the level at which classifier affixes attach marked as head initial?

Earlier we mentioned some evidence that this classifier affix (or theme affix) appears to function as the head of a word. It clearly behaves as an affix in the sense that when it combines with a stem ("X"), it results in an increment in bar level, yielding a word. It is also a head in the sense that it gets assigned the theta-role theme by the stem in much the way that LOC (the head of "'X (stems)) gets a non-theme theta role assignment from the combination of the root.

Theta-role assignment internal to lexical items and the interaction of word internal arguments bearing theta-roles with the syntactic process of theta-role assignment by the verb will
be addressed in chapter 5. Here we can mention that the theme
slot of a matrix verb, although unindexed with respect to
outside arguments, plays a parallel role to the locative
argument markers with respect to Theta-theory. Furthermore, it
is this position into which an X from a syntactic argument
position associated with the theme role can incorporate by
means of a syntactic process of Noun Incorporation. And, it is
this position where the handling classifier, a causative
marker, can occur. As we will see in Chapter 5, presence of
the handling classifier presents interesting problems for theme
assignment, and Noun Incorporation presents interesting
problems for assignment of the agent role.

Thus, all the evidence leads us to suppose that the
classifier affix is the 'X-affix and thus functions as the head
of a word. The fact that there is only one
theme-affix/classifier-affix associated with complex verbs (see
the discussion in Chapter 3) and with negated verbs leads us to
posit that this theme affix is introduced after level 2. This
appears to be bolstered by the fact that this formative has all
the earmarks of an affix, but doesn't appear in head final or
head initial position. However, remember that we argued
earlier for a rule of compounding at Level 3 (the variant of
the compounding rule which combines a base and a stem yielding
a stem, Negative Suffixation) which seem to indicate that like
level 2, level 3 is stipulated as head initial.

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One further qualification needs to be made here concerning the ordering properties of the classifier affix. Although this classifier is always realized con-current with the movement, there is a phenomenon which occurs in platform or stage signing where signs are elaborated by a process which, for lack of a better term, I will refer to as "unraveling." Stage signing frequently involves one handed signs becoming two handed and movements being greatly enlarged; all serving to increase visual salience. A third phenomenon which shows up in such signs is exaggerated sequencing. Signs whose role prominence marker, classifier clitic and sign normally fall together in a single stress unit, are pulled apart with stress on each part and a clear sequencing imposed on elements which were previously realized almost simultaneously.

The ordering in such forms serves as an interesting test for the ordering of the classifier clitic and role prominence marker with respect to the sign, since in unraveled signs, the order clitic - sign is allowable, but sign - clitic is not. Yet, interestingly, the clitics themselves can appear in either order or simultaneously. This is a true instance where there is a distinct precedence relation between clitic and sign which can be phonetically obscured by "fast sign" rules which allow the overlapping articulation of elements signed with different articulators—left hand, right hand, face, body; but no precedence relation between the clitics.
The classifier affix and stem appear to exhibit the same ordering characteristics found between the clitics and the sign, not the true unordered relationship found between clitics. In "unraveled" forms, the theme-affix/classifier-affix is often fully articulated prior to the matrix movement of the sign, and then also perseverates through the articulation of this movement. Sometimes, also, children acquiring ASL sign the classifier affix just prior to the matrix movement and then articulate the actual movement with a simpler and more neutral handshape. They also frequently use unraveled signs or partial unravelings at the stage when they are beginning to master complex embedded themes. All of this may indicate that the simultaneous nature of this classifier may be a surface level phenomena which is phonologically based. This classifier affix never shows up after the articulation of the sign. This is in keeping with the evidence that Level 3 is head initial. Therefore, we can conclude, at least for the moment, that the classifier affix is an affix in every sense. That it is attached at Level 3, after Base Formation. And, that its co-occurrence with movement is phonetically motivated.

How is it that not only simple classifiers, consisting of handshape only but also complex classifiers, consisting of movements, terminators, locations and handshapes; can both be realized concurrent with other motion/location strings? This can be attributed to the many degrees of freedom allowed when the shoulders, elbows, wrists, hands and fingers are involved
in the articulation of the sign. For example, while one hand may move into contact with the other hand, nothing prevents the index finger from simultaneously moving into contact with the thumb in the same manner.

The rule of Theme Association is stated below:

THEME ASSOCIATION:
---------------------
'X-aff, 'X => ['X-aff + 'X]
     X   X
     (mirror image)

Figure 94.

The rule itself allows the combination to be in any order; but the fact that the theme element is an affix (thus must be in head position), in conjunction with the fact that the attachment occurs at Level 3 determines that the ordering will always be classifier-affix + stem. The Levels and their properties can be characterized as follows:
LEVELS OF COMBINATION:
-----------------------

Level 1 (head final)

Rules: Compounding (cannot apply)
Root Formation
Stem Formation

Level 2 (head initial)

Rules: Compounding
Root Formation
Stem Formation

Level 3 (head initial)

Rules: Compounding
Theme Association

Figure 95.

4.3 CONCLUSION

In this chapter we have examined structural properties of word formation and have discovered that the actual combinatorial processes in ASL are astoundingly simple. They consist of combining two elements without any stipulation of ordering. The formatives are distinguished as either affixes or not, and from this two things follow: 1) whether the combination will result in an increment in bar level, and 2) whether one of the elements combined will obligatorily appear in head position. Finally, the level of attachment is specified for head position, and this determines where affixes will be ordered or which of two non-affixes will be considered the head.
The characteristics of ASL word formation do not fit exactly with any of the analyses of lexical phonology and morphology proposed to date for spoken languages (see Kiparsky (1982), Mohanan (1982), Halle and Mohanan (1983). Yet, there do appear to be some level distinctions tied to prefixation and suffixation (see the sources cited above), ordering within compounds vs. ordering within phrases (see Fabb (1984), and the ordering of constituents at different syntactic bar levels (see Travis (1984)); which suggest that the situation in ASL might reflect an unmarked system, not yet obscured by the exceptionality introduced by processes of language contact and language change.

In the next chapter we will assume the word structure argued for here examine its implications for theta-role assignment internal to lexical items. Then we will consider the relation between theta-role assignment internal to lexical items and theta-roles assigned to syntactic arguments.
CHAPTER 5

THEMATIC RELATIONS

This chapter investigates how thematic notions such as source, goal and theme are realized in ASL. Traditional thematic roles are not a homogeneous set; rather, the set contains several more or less autonomous subsystems that serve to indicate quite different notions. The locative roles (source, goal and theme) are discrete categories assignable in some sense to the arguments of the verb, but they are not relevant roles with respect to transitivity as it is characterized by Hopper and Thompson (1980). Agent and patient, which are inextricably tied to notions of transitivity, are in reality names not for discrete categories, but for two different continua—one a continuum of how much control an entity has over the action specified by the predicate, and the other a continuum of how affected an entity is by the action of the verb. The notion of theme constitutes yet another subsystem, that involves not an entity, but an interpretation of the figure-ground structure of an action or state. The theme marks the figure with respect to some ground; where the ground is usually a source, goal or location. Whereas source, goal and theme are consistently and overtly marked
in ASL morphology; agent and patient identification involves more of a construal process which takes into consideration factors such as role prominence, causative marking and locative relations.

Thematic relations in ASL play a central role in both the lexicon and the syntax. In this chapter, we will tease apart the roles thematic relations play with respect to each of these components of the grammar and will argue for autonomy between the system of thematic roles (source, goal, theme) and the dual-continua system of semantic roles (agent, patient).

5.1 THEMATIC RELATIONS IN THE LEXICON

This discussion begins where the analysis of word formation left off. ASL has an extremely complex "word syntax" involving configurational relationships between movements (MOVes) and locations (LOCs) and exhibiting its own system of sign internal theta-role assignment.

All thematic roles indicate a relation between a movement and a location. "Source" marks the locations associated with the beginning of a movement. "Goal" marks the location associated with the end of the movement. And, "theme" marks a location, or located entity which is co-extensive with the movement. The illustration below roughly depicts these relations:
RELATIONS BETWEEN MOVEMENTS AND LOCATIONS:

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>GOAL</th>
<th>THEME</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOC - MOVE</td>
<td>MOVE - LOC</td>
<td>MOVE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LOC</td>
</tr>
</tbody>
</table>

Figure 1.

Notions of source, goal and theme are derivable from basic relations between movement and location. This has consequences for the assignment of thematic roles in ASL.

5.1.1 Determination And Assignment Of Word Internal Theta-Roles

In this section we will explore a way in which theta-role determination and theta role assignment internal to lexical items can be built into the already existing hierarchical model we argued for in Chapter 4. It is designed to also reflect some of the interesting interpretive aspects of theta-role determination which have allowed us to so greatly simplify our model of the ASL lexicon and its combinatorial rule system.

5.1.1.1 Theta-Role Assignment -

Lexical items are associated with a theta-grid. A lexical item (such as a verb) which takes arguments is an open function which requires arguments of specific semantic types to satisfy it. The statement of which types of semantic arguments are required is referred to as a theta-grid. The semantic types referred to by the theta-grid are theta-roles. Theta-roles are relations of the
following sorts: agent, source, goal and theme. This list includes the semantic role (agent) and the locative thematic roles (source, goal and theme). Here we propose a restricted list. Other roles proposed have been: experiencer, location, instrument, patient, etc.. The theta grid associated with a given lexical item such as a verb is generally assumed to be specified in its lexical entry. Consider the following three verbs and their theta grids from Fabb (1984): [1]

1. GIVE
   agent-E
   theme
   goal

2. EAT
   agent-E
   (theme)

3. HIT
   agent-E
   theme

These are included as an illustration. I don't necessarily agree with the choice of theta-roles in a given lexical entry. For example, in the word HIT, except for an arbitrary stipulation that every sentence must have an overt theme argument, it is not clear why the non-external theta-role should be a theme. In a sentence like Sue hit Mary, Mary is not the moving element with respect to the verb, it is the goal. In a sentence like Mary hit the ball into the outfield the same holds true. The ball is the goal of

1. The symbol "-E" indicates an external theta-role, a role which can be percolated to a bar projection of the node (X) carrying the grid. The use of parentheses indicates optional theta-roles.
hit, although in this second sentence, it is also the theme of
into. Such details are irrelevant for the moment, except to
illustrate that the exact details of theta-roles and theta-grids is
not yet fully worked out in GB theory. The exact nature of the
theta-role assigned (its label) is not as important as the process
by which it is assigned. In fact, the grid assigned to a given
lexical item is simply a matter of stipulation. Even the process
of theta-assignment is treated as diacritic in nature. The
following is the statement of Theta-assignment from Fabb
(1984:22-23):

THETA-ASSIGNMENT

(i) A theta-role T is assigned to a node Y when T and Y
are theta-indexed.

(ii) Y may be theta-indexed with a theta-role T when T is
part of a grid associated with X and X governs Y.
If Y and T are theta-indexed, they form a
theta-chain.

The above statement restricts the domain of theta-role assignment
to a domain where the theta assigner governs the element receiving
the theta-role. Markings such as optionality and status as a
external theta-role vs. non-external theta-role in conjunction
with principles that stipulate that obligatory theta-roles get
assigned before optional or external ones can be worked into a
system which will assign theta-roles without explicitly co-indexing
each theta-role assigner/theta-role assignee pair. Still an
element of ad hoc stipulation remains. What constrains the type of
theta-grid that gets assigned to a given verb?
5.1.1.2 Sublexical Theta-Role Assignment -

With respect to syntactic theta-role assignment, ASL works much like spoken languages. The place where it distinguishes itself is in the sense that it overtly reflects the process of composing the theta-grid which gets associated with the theta-role assigner (X). The "word syntax" observable in ASL, systematically predicts the theta-role assigning properties of its output. It is this aspect of ASL sub-lexical structure which we will focus upon for the moment.

First, remember the fact that the value of FROM vs. TO was shown to follow from the position of the terminator affix relative to the base form, MOVE; and that base forms attached subsequently were assigned their value by means of the Thematic Coherence Principle. The dependancy between the base form MOVE and the value of LOC goes both ways. The position of LOC relative to MOVE not only tells us that MOVE is either FROM or TO, but it also tells us whether LOC is a source or a goal. Both formatives can be left unspecified for such details. Everything follows from their ordering and their ordering follows from their level of attachment.

In a sense, the root really is the most basic formative; but, as the Locative Hypothesis would predict, the root is a relation between a motion element (a base form) and a locative anchorpoint (a terminator). Each contributes something to the theta-grid associated with the root. The baseform MOVE transmits the theta-role theme to the root. This theta role is an external theta role which gets assigned to the head of the verb stem, the
classifier affix. The sign really exhibits a mini-syntax where stem is parallel to VP and root is parallel to V. The terminator affix transmits the theta-role of location to the root. It gets its interpretation as source vs. goal on the basis of its ordering relation with respect to the base form. Thus, the roots have two theta roles—one corresponding to a ground relation (source v. goal) and the other corresponding to the figure relation or (theme role). This theme role is transmitted to the stem and the stem assigns this theta role to the classifier affix. The two schemata below illustrate the assignment process we have proposed.

**THETA-ROLE ASSIGNMENT IN TO-TYPE WORDS:**

```
   o
  / \
'X-af \__
  |   | theme j|
Classifier j   'Xa  |
   -- / \ --
    \__
   [theme-E] ['X-af a]i
   | goal i|
   |   'X  | [LOCa]i
   -- / \ --
```

```
   [theme-E]
   | location|
   |   ''X  |   ''X-af |
   --   --   --
   |
   MOVE TERM

Figure 2.
```
The next diagram illustrates theta-role assignment in complex signs with both sources and goals. Notice the conflation of theme roles which occurs concurrent with the process of base formation.
5.1.2 Word Recursion Within The Theme Slot

In Chapter 4, a hierarchical representation of the ASL sign was proposed. By "sign" we mean a motion/location string marked for number agreement and theme association. The theme associated with a given motion/location string may itself be complex. It may
itself consist of a motion/location string marked for number agreement and theme association. In fact, in some instances this complex theme may contain not only a motion/location string, but an attached classifier clitic as well. In other words, it may consist of two words, one of which is a cliticized word classifying the type of ground that the figure moves with respect to. ASL appears to allow for infinite recursion within the theme slot (the classifier-affix position). Furthermore, the element involved in this recursion appears to be a word (an X) and its associated classifier clitic.

There are several bits of evidence which point to the word, as opposed to some other bar-level category as the recursive element. One concerns co-occurrence with a clitic known to attach to lexical items; the second concerns the inability of syntactic processes to refer to theme internal L0Cs; and the third bit of evidence, which is related to the second, concerns the idiom-like nature of embedded themes.

5.1.2.1 Co-occurrence Of Classifier Clitics With Embedded Themes –

The first bit of evidence, which already mentioned above, concerns the ability of clitics, which normally appear at the beginning of a lexical item, to be associated with theme internal motion/location strings rather than the matrix string; thus indicating that these theme internal strings are words. Remember, however, that both matrix and non-matrix clitics appear at the beginning of the matrix motion/location string at PF. Therefore, it is necessary to demonstrate that such classifier clitics are
Indeed embedded.

Embedded clitics are distinguished from their matrix counterparts by their inability to be co-indexed with NPs in the syntax and the discourse. Yet, such embedded clitics can be co-indexed with a LOC which is associated with a motion/location string at the same level of embedding. This was the case with the classifier clitics internal to the handling classifiers discussed in Chapters 2 and 3; but, being reciprocals, the ordering information in these examples becomes a bit difficult to sort out.

Let's consider, instead, a more clear cut example which doesn't involve a reciprocal relation between the classifier clitic and the theme clitic of the motion/location string. The example we will consider involves the embedding of the si4 HIT, which includes a classifier clitic, into the theme slot of a motion sign GO-FROM-X-TO-Y. Such a form would appear in an ASL translation of an English sentence like: *Mary went from the house to the store while continually hitting Sue*. In ASL, the utterance, which would consist of more than a single clause strung together in discourse, would come out something like "*Mary was hitting Sue*, and a continual hitting event moved from the house to the store." The underlined material would be marked as a topic by a special facial expression. The ambiguity of who is hitting who in the second clause is indicative of the ASL utterance, where who does the hitting is determined by the context set up by the initial topic clause. It is this ambiguity which shows us that syntactic processes can't get inside complex themes. However, in working our way up to this example, we will need to examine a series of simpler
examples leading up to a discussion of this final complex form.

The first example to be considered is the sign HIT as it occurs alone and unembedded. In this form, the source and goal of the movement portion of HIT, as well as the LOC associated with its classifier clitic, can be co-indexed with independent NPs in the syntax or discourse—let's say Mary20 and Sue10. The example appears below:

4. HIT (unembedded form, role prominence on the source)

\[
\begin{array}{c}
\text{AT LOC g-CL 10} \\
\text{SBP 20} \\
\text{LOC AT+FROM TO+ON LOC chest s-CL 10}
\end{array}
\]

(long thin object) (person w/ role promin.) (round solid object) (fist)

\[
\begin{array}{c}
\text{person at location 10} \\
\text{role promin. at location 20} \\
\text{moves from chest height at location 20 to contact with what is at location 10}
\end{array}
\]

'person hits person ' (role promin. on person )

\[
\begin{array}{c}
20 \\
10 \\
20
\end{array}
\]

A second variant of this sign is also possible; where role prominence is on the person who gets hit, instead of on the hitter. The only difference involves the co-indexing of the role prominence clitic with location 10 (the goal) instead of location 20 (the source).

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5. HIT (unembedded form, role prominence on the goal)

\[
\begin{array}{cccccc}
\text{AT LOC} & \text{AT LOC} & \text{LOC} & \text{AT+FROM TO} & \text{ON LOC} \\
g-\text{CL} & 10 & \text{SBP} & 10 & \text{chest} & \text{s-CL} & 10 \\
\hline
\text{person at} & \text{person with} & \text{a round solid object (fist)} & \text{moves from chest height at} & \text{location 10} & \text{role prom. at} & \text{location 20 to contact with} \\
\text{location 10} & \text{role prom. at} & \text{moves from chest height at} & \text{location 20 to contact with} & \text{what is at location 10} & \text{role prom. on person} & \text{20} \\
\end{array}
\]

'person hits person ' (role prom. on person )

\[
\begin{array}{ccccccc}
\text{20} & \text{10} & \text{10} \\
\end{array}
\]

'person gets hit by person '

\[
\begin{array}{ccccccc}
\text{10} & \text{20} \\
\end{array}
\]

The next example is the same sign for HIT, but mapped into a reduplication template ([Xixi]) which indicates continual aspect. This is the form of a verb which most frequently appears in theme position, probably because continual aspect makes it more stative, thus more nominal-like. [2] In this example, we will leave out the clitics since they are the same as above, allowing both role prominence possibilities.

2. See Supalla and Newport (1978) which assumes the repetition not to be continual aspect marking, but a nominalization marker. I will assume instead that both reduplicated and non-reduplicated forms can be nominalized, but reduplicated forms are favored. Nonetheless, there are numerous examples of embedded themes which are not reduplicated. Also, in referring to aspectual reduplication I am glossing over many details as to exactly the type of aspectual marking being used: continual, durative, iterative, etc.. These are phonetically distinct in ASL, their differences having to do with differences in acceleration and trajectory of the movement. However, these details are not essential to the point being made here. For more on the distinctions between these forms of aspect marking see Klima and Bellugi (1979).
6. HIT (reduplicated)

[LOC AT+FROM TO+AT LOC LOC AT+FROM TO+AT LOC ]

[chest 20 s-CL 10 | 20 chest s-CL 10]

'person continually hits person '

20 10

Rather than constantly writing the full doubled sign in these cases, we will write a sign like the one above with a notation that it is reduplicated. See below:

7. HIT (reduplicated; shortened notation)

[LOC AT+FROM TO+AT LOC [redup]

[chest 20 s-CL 10]

'person continually hits person '

20 10

Now let's consider the sign in which HIT is to be embedded: GO-FROM-X-TO-Y. Below is this sign with a simple classifier as its theme. The classifier is the simple 3-classifier (3-CL) for vehicles. The sign means "a vehicle moves from location 30 to location 40." With the role prominence marker, the most common interpretation is "go by vehicle from location 30 to location 40."

8. GO-BY-VEHICLE-FROM-X-TO-Y

[AT LOC # LOC AT+FROM TO AT LOC]

[SBP 50 30 3-CL 40]

'person goes by vehicle from location to location '

50 30 40
Finally, we come to the example where HIT instead of the
3-classifier occurs in the theme slot. In notating signs we will
use numbers (1,2,3,...n) when an index had the potential of being
located in a specific position in the signing space which can be
co-indexed with some other clitic or NP. When an internal LOC is
co-indexed with another LOC at its same level of embedding, but
these index positions are not accessible for co-indexing relations
in the syntax, we will use lower case letters (a-h). The lower
case letters i,j,k,... will be reserved for variables which have
not yet been associated with a specific index in the signing space.
The sign which involves embedding the continual form of HIT into a
FROM-TO verb appears below:

9. A-HITTING EVENT-MOVES-FROM-LOCATION 30-TO-LOCATION 40

\[
\begin{array}{c}
\text{AT LOC} \quad \text{AT LOC} \quad \text{LOC} \quad \text{AT+FROM+TO+AT LOC} \\
g-CL \quad \emptyset \quad 30 \quad 40 \\
^\wedge \\
\text{LOC AT+FROM+TO+ON LOC [redup]} \\
\text{b} \quad \text{s-CL} \\
\text{embedded role prom.} \\
\text{classifier clitic} \\
\text{clitic}
\end{array}
\]

'to go from location 30 to location 40 while some
person continually hits some other person'

Notice in the above example that the classifier clitic, although
co-indexed with the lower motion/location string actually appears
before the matrix motion/location string. In this example we see
clearly the ordering relationship between clitic and verb.
Furthermore, in observing the sign, it becomes clear that this
clitic serves as the anchor point for the movement of the embedded
sign, HIT. However, this clitic has no location of its own in the signing space. It moves with the movement of the verb and cannot be referred to by some subsequent co-indexing relation. Furthermore, it is impossible, except by setting up the proper context, to indicate who is hitting who because the indices in the lower motion/location string cannot be co-indexed with matrix NPs. Setting up the proper context would involve signing a prior sentence where the matrix verb is HIT and its source and goal, classifier clitic and role prominence clitic are co-indexed with the intended NP referents: Mary and Sue. Still, the relation between these referents and the LOCs internal to the theme slot of the next verb, will be a matter of construal heavily conditioned by context.

5.1.2.2 The Lexical Integrity Of Embedded Themes -

So, first the fact that a clitic co-occurs with the motion/location string in the theme slot gives evidence that this material must be a word because clitics associate to the beginning of words. And, at some level prior to PF the classifier clitic was associated with the motion/location string in HIT as is evidenced by the co-indexing of this clitic and the goal of HIT. Second, the fact that the LOCs in the motion/location string of HIT, and in the classifier clitic as well, can no longer participate in the syntax; gives a second piece of evidence that this embedded string is clearly internal to a lexical item.
The second piece of evidence follows from assuming some weakened version of the "Lexical Integrity Hypothesis" which states that syntactic rules cannot refer to parts of words. The Lexical Integrity Hypothesis was proposed by Lapointe (1981) as an extension of the Lexicalist Hypothesis proposed by Chomsky (1970). As Borer (1984a) points out, this hypothesis as it stands is too strong since it rules out many instances where agreement rules in the syntax refer to affixes on the verb and most of the null subject analyses which predict the presence or absence of null subjects on the basis of the INFL node (Jaeggli (1982), Rizzi (1982), Chomsky (1981) Safir (1982) and Borer (1984b)). It also would rule out any co-indexing of syntactic NPs or Discourse NPs with the LOCs in the matrix motion/location string of the verb in ASL; and possibly the co-indexing of clitics with these outside NPs as well.

Borer proposes instead that this Lexical Integrity Hypothesis apply only to cases of lexical and not syntactic affixation. (See Fabb (1984) for details on distinguishing syntactic affixation from lexical affixation.) From this it would follow that syntactic rules can refer to parts of words that were affixed in the syntax.

If we assume that the word formation processes which associate LOCs to Roots in the matrix motion/location string in ASL are instances of syntactic affixation this might superficially account for why matrix LOCs can be co-indexed with syntactic arguments and discourse NPs. Of course, given the structure of complex stems, this would mean that all affixation processes, Base Formation, Root Formation and Stem Formation are in the syntax.
Syntactic affixation should not result in a violation of the Projection Principle: the stipulation that lexical features must be represented at every syntactic level. Thus, we should expect the LOCs associated with the matrix string to play some role in determining the number and types of arguments that will show up in the syntax; but, we would expect the embedded theme and LOCs internal to it to play no such role.

Only the theme affix/classifier affix seems to be impenetrable. This theme affix, although it is internally identical in structure to any matrix string, appears to be treated as a frozen lexical whole. There don't appear to be different types of affixation or word formation processes which are lexical or syntactic, but rather the Lexical Integrity Hypothesis seems to be sensitive to whether or not a particular combination rule treats some substructure as a fully formed whole in the lexicon. For the purposes of Theme Association; classifiers, nouns and gerunds are equally complex. They are all impenetrable wholes. They are, perhaps, all words.

Thus, even though LOCs for source and goal appear internal to the embedded string we associate with "hitting," and even though these elements have distinct indices with respect to one another and the goal clitic and classifier clitic are co-indexed; syntactic co-indexing cannot be used to disambiguate who does the hitting and who gets hit.
There are some examples where what appear to be embedded themes, seem to be co-indexed with matrix NPs. Such examples occur in highly restricted classes. The most prominent class concerns the set of verbs involving psych-movement. Although we make mention of them here, we will not get into a detailed discussion of these examples here—primarily because a full analysis is not yet worked out.

5.1.2.3 Idiomatic Properties Of Embedded Themes —

Notice a second fact concerning the embedded form of HIT in the example above. There is never a shift in role prominence in these embedded forms since the role prominence marker never appears in embedded strings. The role prominence marker actually appears to function as a nominative agreement marker (see chapter 6). Its absence in embedded strings fits with the idiom-like property of embedded themes. Marantz (1984) and B. Levin (1983) both discuss the lack of subjects in idioms as evidence that idioms are comprised of verbs and their internal arguments. Interestingly, embedded themes in ASL which structurally share a great deal in common with idioms, have a similar property. If the verb generally takes a classifier clitic (an object clitic), this will appear in the embedded theme. However, subject clitics never appear.

Given the "syntactic" similarity of gerunds, like the HIT-form in the example above, to the words in which they are embedded; we might want to think of these complex themes as idioms of a sort. They have their own syntactically consistent internal structure, their own set of internal thematic relations, their own agreement
structure and internal co-indexing relations, yet unlike matrix motion/location strings they don’t seem to have any consequences for the theta-role assigning or case assigning properties of the word within which they occur. Furthermore,

Consider the sign for VOTE in ASL. The sign VOTE in ASL takes a single syntactic argument, a subject; and this subject is taken to be an agent despite the fact that it is also assigned the thematic role location (technically, a goal with focus on the terminal relation). Despite the fact that this verb takes a single syntactic argument, a classifier clitic is present. Although this clitic precedes the matrix verb, it is actually part of an embedded theme. The embedded theme corresponds to a phrase like "enter a container while handling some object." Even though this classifier clitic (o-CL; classifier for container) serves as a goal for the movement of the embedded theme and is co-indexed with a LOC which has the interpretation of "goal," it does not require the presence a goal argument in the syntax. In other words, it does not stand in violation of the Projection Principle—the stipulation that lexical features must be present at every syntactic level. Thus, we conclude that the internal structure of the theme is irrelevant to the syntax. The sign for VOTE appears below:
The sign above can refer to any kind of voting: dropping a ballot in a box, pulling a lever, raising one's hand, etc. The fact that the embedded theme literally can be interpreted as "putting something into a box" is irrelevant to the meaning of the sign. It is an idiom for "voting." As such, it has a more restricted meaning than its counterpart at the matrix level would have. The embedded classifier clitic does not affect the theta-grid of the matrix form. The sign VOTE can occur in a single argument sentence like the one below. For the gloss VOTE, substitute the entire representation above:
11. Sue votes.

12. PUT-X-INTO-CONTAINER

Now consider a second sign where PUT-X-INTO-CONTAINER is no longer embedded. The only difference between these two signs is the absence of the highest motion/location string AT LOC-10. However, a consequence of the absence of this uppermost string is that the sign PUT-INTO-A-CONTAINER is no longer embedded and thus its classifier clitic is syntactically accessible.

(person w/ role prom. at location 10) (container at location 10) (two long thin objects handling some-objects at thing move into what is at location b; location 20) opposed)

'to vote by dropping a ballot into a box; to drop a thin flat object into a container, etc.'

The example above can mean 'to vote' but only if voting is done by

- 379 -
dropping a ballot into a box. Furthermore, it is not restricted to
the meaning 'vote.' This sign has any literal interpretation
compatible with the classifiers which comprise it—any act of
putting some thin flat object into a container. Furthermore, this
sign requires not only a subject, but another syntactic argument as
well; one which can be assigned the theta-role, goal. As we will
see, absence of a goal argument in the sentence will violate the
projection principle. The following sentence is acceptable with
PUT-X-INTO-CONTAINER:

13. Sue dropped a ballot into the box.

\[
\begin{array}{c}
\text{AT LOC} \quad \text{AT LOC} \quad \text{TO-AT LOC} \quad \text{PUT-X-INTO-CONTAINER} \\
\D (20) \quad \emptyset \quad (10) \quad 20 \\
\text{BOX} \quad \text{s-u-e} \quad \text{WARD LOC} \\
\end{array}
\]

However, if the sign PUT-X-INTO-A-CONTAINER does not cooccur with a
syntactic goal argument it will be ungrammatical. [3] The two
forms VOTE and PUT-X-INTO-A-CONTAINER are ungrammatical if
substituted for one another in the sentences above:

3. This should be clarified a bit. As we will
see in Chapter 6, ASL allows zero topics. Therefore,
if the classifier clitic is co-indexed with some NP in
the discourse, even though it may not be overtly
present in the sentence, the sentence will be
grammatical. Also, classifier clitics carry a certain
amount of substance themselves. Thus, if the classified
clitic appears indexed to some location in the signing
space which is new; the missing argument could be
taken to be the unmarked interpretation of the
classifier clitic (some kind of a container). With the
zero topic case and the arbitrary interpretation cases
excluded, the sentence is unacceptable.
14. Sue put something into a container. (no goal NP)


15. Sue votes a box. (extra argument)

*BOX20, SUE INDEX10 VOTE10.

Remember that the glosses are just a space saving device. The actual signs should be substituted for these labels above. Also, the signs described are closely morphologically related; a fact obscured by the glossing. [4]

Thus far we have seen that there are thematic roles which occur internal to lexical items and play no role with respect to the arguments a given verb will select for, and there are other instances where the thematic roles which occur do play a role in argument selection. We have also seen that the positions in the word where thematic roles are relevant to the syntax are also the positions where co-indexing with outside NPs are allowed. The domain which appears to be opaque with respect to any kind of syntactic relations external to itself appears to be the slot where embedded themes, simple or complex occur. This theme slot is the same as the position where the classifier affix occurs. Thus, the classifier affix although attached by a syntactic affixation rule is not itself penetrable by syntactic processes. Whatever chunk is

4. Finally, there is a great deal of dialectal variation concerning the sign VOTE. Some signer's use the o-handshape (curved four-fingered plane and thumb opposed), others use the f-handshape (curved long thin object and thumb opposed), and in still others in frozen forms the o-handshape is realized as an s-handshape (fist). Such surface variation is irrelevant to the point being made here.
affixed, comes to this level fully formed, and as such functions as an impermeable unit. Whatever rules of affixation or compounding are involved in its composition are not syntactic affixations or compounding at the level at which theme association occurs.

5.2 THEMATIC RELATIONS IN THE SYNTAX

In order to consider thematic relations in the syntax, we must understand co-indexing between syntactic NP arguments and the locative argument markers (LOCs) on the verb. This is just one small part of the co-indexing system in ASL, and clearly not the only part relevant to the syntax. To address markers of agency we will also need to examine the co-indexing possibilities attributed to the role prominence clitic. And finally, to examine sensitivity of the ASL sentence to figure-ground relations, we must understand the co-indexing possibilities of the classifier clitic.

In Chapter 6, we will come back to the same co-indexing relations for the purposes of considering the role of the classifier clitic and the role prominence clitic in case marking and the nature of empty categories in ASL. In this chapter, we will not consider the case marking role of the clitics.

In our discussion of the idiom-like properties of embedded themes, we roughly introduced a few ASL sentences. These included external NPs, clitics and the verb with its LOCs. Having seen the basic framework of the ASL clause, we must note a few complications that play a role later in our discussion. There are basically two matters to discuss: the way NPs are assigned locations in space
and the existence of clitic pronouns on the ASL verb.

Previous studies have addressed the co-indexing [5] of noun phrases and locations associated with the beginning or endpoints of verb movements. [6] First, a noun phrase is associated with some position in the signing space (a horizontal space extending outward from the signer at about waist level), usually by means of a pointing gesture. The noun phrase signed and cliticized to the end of this sign is a pointing gesture to some unique point in space. This noun phrase plus indexing gesture is called an "identificational clause." See the representation below:

16. 'Mary is associated with location 10'

```
  AT LOC     # TO+AT LOC
  ☞        ☞
  M-a-r-y   WARD LOC
  ☞        ☞
g-classifier
```

The above representation can be read as follows:

The fingerspelled sequence m, a, r, y (M-a-r-y) is signed at some neutral location (AT LOC©) and is seen as unindexed. Cliticized to this NP is a deictic gesture which involves the movement of an index finger (g-classifier for

5. The co-indexing referred to here not only indicates co-reference, but is overtly realized spatial co-indexing. The co-indexing we are discussing here is directly observable in the sign stream.

6. Some of this discussion will be a review of structural aspect of ASL introduced in previous chapters. It serves two purposes. The first is pure review. The second is that it allows us to separate the generally agreed upon issues which are represented to varying degrees and in varying formats in previous analyses from the analysis to be proposed here. In particular, we refer to the recognition of the role played by the role prominence clitic and the classifier clitics.
"long thin objects"), which is oriented toward some location (WARD LOC), to (TO) a position proximal to (AT) a location in space (LOC) which we will arbitrarily label as location 10 (LOC10)—i.e., TO+AT LOC10.

This indexing construction serves to associate the NP, Mary with a unique location in space, location 10. Subsequently, within the discourse, any act of pointing to or spatial agreement with location 10 will constitute reference to this NP. For example, the following ASL pronoun, typically unspecified for gender, would unambiguously refer to Mary:

7. ASL PRONOUN: 'person 10'
------------------------ [7]

\[ \text{TO+AT LOC} \]
\[ \text{WARD LOC} \]
\[ 10 \]
\[ g\text{-classifier} \]

Notice that the pronoun is identical to the deictic gesture cliticized to the NP in the identificational clause establishing the index referent of MARY.

The next example illustrates spatial agreement of the verb HIT with two locations—the source (location 20) and the goal (location 10). The sign gets the interpretation 'person 20 hits person 10,' where 20 and 10 are the indices assigned to the locative argument markers for source and goal. A more precise account of the

7. For purposes of expediency we will frequently shorten notations like the one below which indicate movement to proximity with some location from TO+AT LOC to "TO LOC." The same shortening will apply to LOC AT+FROM yielding "LOC FROM." These representations are equivalent.
internal morphology of the sign might be 'a fist moves from location 20 to location 10.' The representation for the sign HIT appears below, followed by a prose description of the same sign.

16. HIT: 'person 20 hits person 10'
-----------------------------

LOC AT+FROM TO+ON LOC
20 ☐ ☐ 10
s-classifier

**Prose Description:** A round solid object (s-classifier), in this case a fist, moves away from proximity to location 20 (LOC20 AT+FROM) to contact with (ON) something at location 10 (TO+ON LOC10).

If the verb HIT with the spatial indexing above were to occur in the same sentence or discourse with Mary-10, then Mary would be interpreted as the goal of HIT. The source would be whatever NP happened to be associated with location 20. Let's say it's Sue, a NP which would resemble the indexing phrase for Mary. Actually, in ASL such indexing constructions can be phrases within a sentence or can exist as independent sentences themselves.

19. 'Sue is associated with location 20'
-----------------------------

AT LOC ☐ ☐ TO+AT LOC
S-u-e ☐ ☐ 20
WARD LOC
g-classifier

At this point we have introduced all the pieces of the ASL sentence/discourse which have traditionally been considered relevant to issues of coreference: indexed NPs, pronouns and
locative agreement markers. They all share something in common—the presence of the locative argument marker (LOC) plus an index \( (i,j,k...n) \). This bi-morphemic unit will be referred to as the "LOCi marker." The LOC marks a location which serves as an anchor point for the movement of a motion/location relation (TO, FROM, IN, ON, AT, WARD [8]) and the "index" associates this abstract anchor point with some specific position in the signing space. The variables \( i,j,k...n \) range over an infinite set of possible spatial locations. It is the LOCi marker which makes overt co-indexing possible.

The LOCi marker has been referred to as an agreement marker. This label must be qualified. The LOCs in a verb like LOCi-FROM-TO-ON-LOCj are agreement markers in the sense that they agree with (are co-indexed with) the locations of specific NPs that hold particular thematic relations with respect to the verb. The thematic roles and the configuration of the roots which assign them are listed below:

20. ROOTS AND THEMATIC ROLE ASSIGNMENTS:
-----------------------------

<table>
<thead>
<tr>
<th>LOC Term+MOVE</th>
<th>MOVE+Term LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>source</td>
<td>goal (of movement)</td>
</tr>
</tbody>
</table>

\[
\begin{align*}
&\{\text{IN}\} & &\emptyset+\text{WARD LOC} \\
&\emptyset+\text{ON} & | & \text{goal} \\
&\{\text{AT}\} & | & \text{location (of orientation)}
\end{align*}
\]

8. Most of these relations are self evident. The WARD relation marks 'orientation toward' as in the English words downward, upward, inward, outward, heavenward, leeward, etc.
These "agreement markers" play a crucial role in the assignment of theta roles to the nominals co-indexed with them, but they do not play a crucial role with respect to Case Theory. They do not function as AGR in the sense of Government and Binding Theory. The elements central to Case Theory appear to be the role prominence clitic and the classifier (or non-theme) clitic; two pieces of the ASL sentence not yet introduced, and, surprisingly, two grammatical formatives which have received little attention in the ASL linguistics literature considering their central role in ASL grammar.

The verb complex that will encode the meaning of Sue hitting Mary is actually a locative/directional verb, clitics, and agreement markers that together constitute a single phonological unit (a "stress group"). The overall structure of the verb complex is:

21. SCHEMATIC REPRESENTATION OF A COMPLEX VERB:

```
clitic - clitic - agreement - verb - agreement
     marker                        marker
                                      \---/                    \---/
                                      incorporated                classifier
```

The first two units in the verb complex are clitics. These clitics are themselves clausal. The first clitic is a clausal form meaning something like "there is a person at location 10". (Thus it refers back to the person assigned to location 10, the person who gets hit, the goal, i.e., Mary.) This clitic is composed of a
locative morpheme, AT (meaning "to be at a place"), which is made by a placing motion. This placing motion has incorporated into it (as all motions do) a classifier, in this case a classifier for persons. (Actually, this is the long thin object classifier again, only in a vertical orientation this time.) This classifier classifies the goal of the hitting (Mary). This clitic can correspond to a source, goal or location, but can never classify the theme. The placing motion is made at the location that has been assigned to Mary, i.e., LOC10:

22. CLASSIFIER CLITIC/NON-THEME CLITIC:
-----------------------------------------

AT LOC 10
 g-classifier (person)

'a person is at LOC:0' (the index finger (g-classifier) in a vertical orientation is placed AT location 10, previously assigned to Mary in the identificational clause'

This first clitic—which identifies the goal—is followed by a second clitic. This second clitic also involves the verb stem AT, but this time the placing motion has incorporated into it a "role prominence marker". The role prominence marker is in actuality the signer's body, which is placed at (shifted to) a location already assigned to some referent. This singles out some entity as having role prominence, the entity from whose perspective the action is viewed. In this case, let us assume that we want to assign role prominence to the hitter, Sue. Then the signer's body (role prominence marker)[9] is placed AT location 20, the location previously assigned to Sue:
Thus, these two clitics, which are phonologically attached to the following verb refer back to the source (the hitter, the location where the hitting starts, Sue) and to the goal (the hittee, Mary). The role prominence marker need not be co-indexed with the source of the verb although such co-indexing is common when the source is co-indexed with a [+human] NP. The role prominence marker can be co-indexed with the goal (in the above case, such a co-indexing would yield a "passive reading;" although the verb exhibits no passive morphology. Additionally, this role prominence marker may be co-indexed with neither the source nor the goal, but rather with some additional NP, yielding an interpretation commonly associated with the ethical dative. This is most common with unaccusative verbs with inanimate themes as in "the cup fell off the table on Mary" (non-locative, adversative ethical dative reading of "on.")

"A cup fell off the table on Mary."

Similarly, if the role prominence marker were to be co-indexed with some NP which does not correspond to the locative argument of the verb HIIT, the interpretation would be 'Some person with role prominence was aware of Mary's hitting Sue.' In Chapter 6, the role prominence clitic is argued to be a subject agreement marker which functions like a nominative case marker in most instances (when it agrees with the source or when it can be construed as agent [11]) and like a dative subject or ethical dative elsewhere. The involvement of the clitics in the marking of grammatical relations and in agency marking will not be addressed in this section we will come back to agency marking in a later section and to case marking in Chapter 6.

10. "Theme chaining," as we pointed out in Chapter 3, indicates that although two separate themes are present they appear to have a single articulation.

11. In an active sentence, when the theme of a verb contains a handling classifier (a hand holding some object, rather than an object itself), the role prominence marker is taken to be an agent.
In the simple sentence meaning "Sue hit Mary," the main verb is "LOC20-FROM TO-LOC10" (assuming that Sue is assigned to LOC20 and Mary to LOC10). This verb has a classifier for Round Solid Objects (fist, in this case) embedded in it. The verb can have as its first clitic a stem AT-LOC with a classifier for persons (g-CL) associated with it. This clitic has its LOC set to the location of the Goal (the hitee = Mary), i.e. agrees with the Goal. So it means something like "a person AT LOC10". This clitic is optionally followed by another clitic. This clitic places a marker of "role prominence" (actually the signer's body) at the location of the Source (here the hitter = Sue), i.e. at location 20. The signer's body shifts into LOC20, marking this location as the location of the entity that has role prominence, or from whose perspective the action will be viewed. The whole sentence, then, is:

25. 'Sue (with role prominence) hit Mary.'

---

Mary TO-LOC, Sue TO-LOC AT-LOC #AT-LOC #LOC -FROM#TO+ON-LOC

g-classifier g-classifier g-class r.p.clitic s-classifier

|__________|________|_______|________|
ident. phrase ident. phrase object r.p. verb
critic critic

Mary Sue long thin person w/ a round solid object
20 10 obj. class. role prom. moves from LOC20 to
(person) at LOC20 being in contact
at LOC20 with LOC10
The same sentence, but with role prominence on Mary instead of Sue differs only minimally from the sentence above. The role prominence clitic agrees with location 10 instead of location 20. Such a sentence is interpreted with a kind of passive reading, even though no passive morphology appears on the verb: "Mary got hit by Sue." This variant appears below:

26. 'Sue hit Mary (with role prominence).'
-----------------------------------------------

MARY TO-LOC , SUE TO-LOC AT-LOC #AT-LOC #LOC -FROM#TO-ON-LOC
  10 20 10 10 20 10
g-classifier g-classifier g-class. r.p. clitic s-classifier

|____________| |_______| |_______| |__________________|
ident. phrase ident. phrase object r.p. verb
clitic clitic

Mary Sue long thin person w/ a round solid object
20 10 obj. class. role prom. moves from LOC20 to
(person) at LOC10 being in contact
at LOC20 with LOC10

In all of the above sentences, the object NP has been fronted to the beginning of the sentence. This is typical of sentences where the matrix verb is associated with a classifier clitic. The verb HIT, much like the sign VOTE, has two variants. In its second variant the FROM-TO movement of the s-classifier (round solid object) which contacts a g-classifier (person) is embedded under a WARD LOC. In this example, both the classifier clitic and the FROM-TO motion/location string are embedded. Therefore, the classifier clitic is no longer accessible to the matrix sentence and as such cannot trigger NP-fronting. This version of HIT typically involves orientation of the hitting movement toward the
hittee but the movement no longer terminates at the index point associated with the hittee. The verb is still transitive (subject-orient toward-object), but it no longer syntactically agrees with the source and goal of the hitting movement. [12] This second variant of HIT which doesn't trigger NP-fronting appears below:

27. 'Sue (with role prominence) hit Mary.' (non NP-Fronting Example):

\[\text{Sue \ TO-LOC} \quad \text{AT-LOC} \quad \# \text{AT-LOC} \quad \# \quad \text{WARD LOC} \quad \text{Mary \ TO-LOC} \]
\[\text{g-classifier} \quad \text{g-class.} \quad \text{r.p.} \quad \text{LOC FROM TO-ON LOC} \quad \text{a} \quad \text{g-classifier} \]
\[\text{ident. phrase} \quad \text{object} \quad \text{r.p.} \quad \text{verb} \quad \text{ident. phrase} \]
\[\text{clitic} \quad \text{clitic} \]

Sue 20 long thin person with a round solid object 20
20 (person) at LOC20 moves from LOC20 to
at LOC20 being in contact
with LOC10

5.2.1 Source/Goal Vs. Subject/Object Agreement

Given this account of ASL, it is immediately apparent that the semantic roles selected for by the ASL verbs are inherently locative ones. In fact, this is nearly trivially the case. ASL base forms have meanings similar to English locative/directional prepositions. Like most prepositions in English, the ASL base

12. This example is included to avoid confusion between the two forms, one which triggers NP-fronting and the other which does not. A detailed discussion of how the presence of classifier clitics in the matrix clause is associated with NP-fronting appears in Chapter 6. The non-fronting example is the more commonly occurring form.
forms assign locative/directional roles to their arguments, namely, to the LOCs associated with the roots. The ASL complex verb, a FROM-TO motion/location string serving as the matrix string, agrees with a Source and a Goal. The Source agreement is accomplished through the initial LOC. This LOC is interpreted as co-referential with some nominal that has already been assigned this location, and the nominal is then interpreted as a Source vis-a-vis the complex verb. The Goal agreement is accomplished through co-indexing of an NP argument with the final LOC on the verb.

The exact interpretation of Source and Goal varies with the interpretation of the verb. If the verb is interpreted in a literal locative/directional meaning, the Source and Goal stand for literal locations, the origin of motion and the terminus of motion respectively.

28. 'I walked from location 40 to location 70'

-------------------------------- [13]

\[ \text{AT LOC1st per. [13] TO LOC1st per. LOC40 FROM TO LOC70} \]

\[ \text{SBP} \quad \text{g-classifier} \quad \text{WARD LOC} \]

\[ \text{v-classifier down (legs)} \]

I walked from there (the place previously assigned to LOC40) to there (the place previously assigned to LOC70).

In literal locative sentences, the LOCs on the verb in ASL agree with the literal source or goal; not, for example, with the nominal that would be the subject in English, nor with the Agent.
Thus, note that in the example above, the first LOC does not agree with the first person. Also, in the example below, assuming that Sue has been assigned to LOC30, the verb does not agree with LOC30—the Agent and the Subject in the English translation:

29. 'Sue moved the book from location 40 to location 70.'

S-u-e TO-LOC30 LOC40-FROM#TO-LOC70

g-classifier WARD LOC
b-handling CL

Sue moved the book from there to there. (If LOC40 had been assigned to the chair and LOC70 to the table, then the sentence would mean "Sue moved the book from the chair to the table.")

13. In the remaining examples in this chapter, we will not subscript the indices on LOCs. This is because we will frequently refer to them in the text and given word processing limitations subscripting is not possible in the text. Also, in referring to unindexed NPs in identificational clauses we will use the bare NP rather than the full representation where this NP (e.g., S-u-e) is embedded under AT LOC0. Furthermore, we will give only the matrix relation (TO LOC) in the indexing phrase, omitting the embedded WARD LOC. The example sentences are long even with these shortenings. Our goal is to remove extraneous detail in order to focus on the relationship relevant to the discussion at hand.

14. The 1st person index is almost the neutral position of the signer's body. There appears to be a slight distinction between "unindexed" and "1st person index" (p.c. Rick Lacy). The difference seems to lie in the posture of the body. The body in 1st person position seems to be slightly a back from the neutral index. Also, 1st person indexing can be distinguished by averted eye gaze. Third person agreement co-occurs with eye gaze to the third person position. Second person agreement co-occurs with eye gaze to second person. And 1st person agreement co-occurs with averted eye gaze.
As we pointed out in Chapter 2, for many verbs, though they involve literal movement in space, source and goal are interpreted as the person (or thing) occupying the original and terminal locations, and not those locations themselves. For example:

30. 'Sue (with role prominence) hit Mary.'

If one simply glosses the verb above as HIT, it looks as if ASL has person agreement, but in fact the verb still agrees with the source and goal. We see a similar phenomenon with verbs which involve abstract domains rather than literal movement in space.

If a verb is interpreted, not as literal movement in space, but is figuratively extended to cover an abstract domain, the source and goal also take on figuratively extended meanings. For example, possession is treated by many languages as a figurative sort of transference in an abstract "space" (possession) from one abstract location (possessor) to another abstract location (possessor). The source and goal must stand for the original and terminal "places" in the abstract domain, not in literal space. Thus, even if Sue (assigned LOC30) has reached and taken a book off the table (LOC40) and handed it to MARY (LOC70), ASL will agree with Sue (LOC30) and not the table (LOC40), if the meaning is "give" (transference of possession).
31. 'Sue gave Mary a book'

The first LOC agrees now with "Sue." This again makes it look like ASL has subject agreement, but in reality it agrees with Sue as source (first possessor) in the abstract domain of possession to which the locative notions have been extended. ASL can perfectly well agree with a literal location in the example below (e.g. the table assigned to LOC40), and not with "Sue", but in this case the sentence must get a literal locative meaning and only optionally also a figuratively extended one which implies transference of possession:

15. BOOK in the above example is a noun incorporated into the verb. Such nouns always hold the theta-role theme with respect to the verb. The evidence that this noun is actually incorporated into the verb comes from its position between the role prominence clitic and the verb. Remember that the role prominence clitic attaches to the beginning of the verb. In this case it attaches to the beginning of a verb with an incorporated noun. This incorporation process always involves an X, and furthermore it appears to be a syntactic process, since when this X is part of an adjective phrase, let's say, its modifiers are left behind in the syntactic argument position. Thus, although the noun appears internal to a lexical item it appears to have moved to that position by a syntactic rule, leaving behind a trace. For more on such incorporation phenomena see Kegl (1976a), Baker (1983), Sadock (1980), Postal (1962) and, of course, Sapir (1911).
32. 'Sue handed a book from the table to Mary'

There is no reason here to say that the ASL verb has "Subject agreement" or "Agent agreement."

5.2.1.1 The Backwards Verb Illusion -

Strong confirmation of the source/goal agreement in ASL comes from the existence of so-called "backwards" verbs. In ASL a verb meaning "take" or "steal" takes as its first locative argument marker the source, despite the fact that this is not the agent, nor the nominal that in English shows up as the subject.

In the examples below, we will focus upon the verb complex and not the ordering of the NP arguments which can be in argument position, in sentence internal topic position or in the preceding discourse. We will simply indicate at the beginning of each
example the referent associated with each index. This information will be in parentheses.

Below is a gloss version of a sentence involving the verb meaning "take" in ASL:

33. 'Sue took a book from Mary.'

(Sue=LOC30; Mary=LOC70) BOOK TAKE
70 30

It has been claimed that TAKE is a backwards verb, because the agreement is the reverse of the order we would expect in a verb like GIVE. See the gloss version below:

34. 'Sue gave a book to Mary.'

(Sue=LOC30; Mary=LOC70) BOOK GIVE
30 70

But this process only appears "backwards" because the ASL verbs have been glossed as "TAKE" and "GIVE," respectively. If we represent the verb in a notational system more in keeping with their internal structure, we see only the regular pattern FROM#TO:

Consider the following two examples involving TAKE and GIVE:
35. Sue took a book from Mary.

(Sue=LOC30; Mary=LOC70)

-------------

\[
\text{at LOC30} \quad \# \quad \text{at LOCO} \quad \text{LOC70 WARD+FROM TO+WARD LOC30}\]

\[
\text{SBP} \quad \text{BOOK} \quad \text{grasping classifier [16]}
\]

person w/ role prom. (Noun Inc.)
book a grasping goes from location 70 to location 30

at loc. 30

36. Sue gave a book to Mary.

(Sue=LOC30; Mary=LOC70)

-------------

\[
\text{at LOC30} \quad \# \quad \text{at LOCO} \quad \text{LOC30 WARD+FROM TO+WARD LOC70}\]

\[
\text{SBP} \quad \text{BOOK} \quad \text{WARD LOC} \quad \text{b-handling CL up}
\]

person w/ role prom. (Noun Inc.)
a handling goes from location 30 to location 70

at loc. 30

So, in a sentence meaning "Sue took the book from Mary" the verb agrees with Sue (i.e. source) as the first LOC and with Mary (the goal) as the second LOC. And, in a sentence meaning "Sue took the book from Mary" the verb agrees with Mary (the source) as the first LOC and Sue (the goal) as the second LOC. Notice that in both

So, in a sentence meaning "Sue took the book from Mary" the verb agrees with Sue (i.e. source) as the first LOC and with Mary (the goal) as the second LOC. And, in a sentence meaning "Sue took the book from Mary" the verb agrees with Mary (the source) as the first LOC and Sue (the goal) as the second LOC. Notice that in both

16. The complex grasping classifier referred to here has the full representation given below:

\[
\text{Grasping Classifier:} \quad \text{AT LOCa} \quad \# \quad \text{WARD LOC} \\
\text{\quad c-CL} \quad \text{\quad TO+GW LOCa down} \\
\text{\quad th-CL}
\]

- 400 -
these examples the role prominence marker agrees with Sue. The indexing of the role prominence marker, not the LOCs, is the process which should be focussed upon for purposes of subject/object agreement. We will come back to this point later. There is nothing "backward" about the verb agreement. Source is intial and goal is final in both instances. Only if we mistakenly presume this agreement to be related to subject and object marking do we get the illusion of backwardness.

5.2.1.2 Non-Arguments Against Source/Goal Agreement -

Padden (1983) gives several arguments for subject agreement in ASL rather than Source-Goal. Her arguments run into problems primarily because she does not separate agreement with the role prominence marker and the classifier clitic from agreement with locative argument markers on the verb. I will argue that if we separate the two types of agreement, we will find that ASL has both source/goal agreement and subject/object agreement; and that these two agreement systems are serve totally different functions in the grammar. The first is concerned with theta-marking and the second with case marking.

Ignoring the distinction between the two types of agreement has lead to several problems concerning the analysis of the ASL lexicon. First, many researchers have noticed a dichotomy between the agreement phenomena related to pure motion/location forms and extended forms involving person agreement. Assuming that locative agreement markers were markers of grammatical relations, lead these researchers to propose that there were two separate lexicons in
ASL. One involving motion/location forms and the other involving the rest of the lexicon. See in particular Padden (1983) and Supalla (1982).

Instead, we can see that there is no need to postulate independent sub-lexicons in ASL. Instead, the mapping between case relations and theta-roles which is often conflated in the surface realization of spoken languages like English is independently realized in ASL. The locative argument markers (LOCs) mark thematic relations in all forms. The role prominence marker and classifier clitics mark case relations in all forms. In certain extended forms, NPs marked as sources and goals are also marked as subjects and objects. Sometimes the marking is subject-source/object-goal (e.g., GIVE-type verbs) and other times the marking is subject-goal/object-source (e.g., TAKE-type verbs). This is expected given the independence of the two systems.

Furthermore, in literal motion/location forms (e.g., MOVE type verbs) neither the source nor the goal is marked as the subject. An independent NP receives this case marking. This follows from the independence of the two systems as well. We will examine the two systems more in Chapter 6, but for now let's turn to some of Padden's arguments against source/goal agreement.

Padden (1983:152) describes "backwards" verbs as follows:

In contrast to other Inflecting verbs, the subject agreement marker on Backwards verbs is not located at the beginning point, but at the end point, and the agreement marker for the notional direct object is instead located at the beginning.
She argues that this distinction is a morphological not a syntactic or semantic factor. She proposes the following account of Verb Agreement by means of a general statement (in Relational Grammar Terms) and a sub-stipulation pertaining to Backwards verbs:

**Grammatical Relations (GR) Analysis: Verb Agreement:**

The initial point of inflecting verbs mark for person and number of the final 1 and the end point, the final 2 of the clause.

**Backwards Verbs:**

One subclass of Inflecting verbs is morphologically backwards. Accordingly, with respect to verb agreement, the initial point marks for final 2, and the end point, the final 1 of the clause.

[Padden (1983:117)]

The generalization being missed in Padden's analysis is being missed in Relational Grammar as well as in GB Theory terms. She is not forced to this analysis by her choice of framework. Although, it is true that the verb agreement must be stipulated in terms of final 1s and 2s because ASL has obligatory 3-to-2 advancement and locative-advancement; and, thus, invariably agrees with the final 2s not the initial 2. Arguments for this can be found in Kepl (1976b) and Padden (1983).

5.2.1.2.1 The Agreement Marker Omission Argument —
Padden argues that the first agreement marker on the verb in a sentence like the one meaning "Sue gave Mary a book" above can be omitted. In such examples the actual subject NP remains in the sentence. On the other hand, only the second agreement marker in sentences with backwards verbs (TAKE, STEAL, etc.; see "Sue took a book from Mary") can be omitted, not the first. Below is a chart illustrating these facts. Remember that in ASL the source is the first agreement marker:

<table>
<thead>
<tr>
<th>(Agent/Source)</th>
<th>(Patient/Goal)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S-u-e30</td>
<td>M-a-r-y70</td>
<td>30 GIVE 70</td>
</tr>
<tr>
<td>S-u-e30</td>
<td>M-a-r-y70</td>
<td>0 GIVE 70</td>
</tr>
<tr>
<td># S-u-e30</td>
<td>M-a-r-y70</td>
<td>30 GIVE 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Agent/Goal)</th>
<th>(Patient/Source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-u-e30</td>
<td>M-a-r-y70</td>
</tr>
<tr>
<td># S-u-e30</td>
<td>M-a-r-y70</td>
</tr>
<tr>
<td>S-u-e30</td>
<td>M-a-r-y70</td>
</tr>
</tbody>
</table>

Padden pointed out that what is omitted is an agreement marker for what shows up as the subject in English, which in these cases is the Agent. She points out that an analysis that states agreement in terms of sources and goals will need two separate statements to account for this rule. However, once again, this argument stems from taking the English glosses too seriously. We have already said that the ASL complex verbs are made up of simple stems. The verbs glossed GIVE and TAKE in the sentences we discussed earlier
are complex FROM#TO verbs. They contain both a FROM and a TO. The sentences with missing Agent markers above, really involve simple FROM and TO stems. There is no reason to assume that they were derived by rule. In fact, such a rule might very well violate the projection principle.

37. 'Sue gave Mary a book.'

----------

S-u-e TO-LOC30 M-a-r-y TO-LOC70 AT LOC30 # TO-LOC70

\[ g-CL \] \[ g-CL \] \[ SBP \] \[ WARD LOC \]

\[ b-handling CL up \]

Sue 30 Mary 70 person w/ a handling role prom. went to at loc. 30 location 70

38. 'Sue took a book from Mary.'

----------

S-u-e TO-LOC30 M-a-r-y TO-LOC70 AT LOC30 # LOC70-FROM

\[ g-CL \] \[ g-CL \] \[ SBP \] \[ WARD LOC \]

\[ grasping CL down \]

Sue 30 Mary 70 person w/ a grasping motion role prom. moves away from at loc.30 location 70

Padden states that the generalization concerning source omission must be stated in terms of subjects and not in terms of sources and goals. In this sense, she is correct. The generalization concerning the forms above does follow from subject marking; but not her sense of subject marking. Notice that in
both examples above the role prominence marker is co-indexed with the NP argument which is not co-indexed with a locative argument marker on the verb. The role prominence marker, as we will see in Chapter 6, has all the earmarks of a subject agreement marker in the strong sense of agreement marker (AGR). It not only agrees with the syntactic argument that functions as the subject, but it also conditions subject pro drop. The presence of a role prominence marker, in conjunction with the handling classifiers which serve as causative markers forcing the construal of some outside NP as the Agent—usually the NP sharing an index with the role prominence marker; makes any statement of source with respect to these verbs incredibly redundant. It seems only logical that in such a situation a simple verb would be used in preference to its more redundant complex counterpart. Again, there is no rule applying. This is a matter of stylistic choice, as is evidenced by the optionality in choosing the simple or complex verb. English reflects this obligatorily in not allowing sentences like: Sue gave a book from herself to Mary.

The generalization actually concerns objects more than subjects. ASL consistently marks subject agreement with a clitic. Only certain verbs have an object agreement clitic (a classifier clitic) associated with them. Generally object marking is a matter of government by the verb. Given the possibilities for movement rules and zero-topics in ASL, its no wonder that there is a requirement that the theta-markers for objects consistently show up on the verb.
5.2.1.2.2 The INVITE Argument

Another argument that Padden makes concerns agreement with the verb INVITE--another backwards verb. The argument goes as follows: If we accept the general notion of "goal," then in a sentence meaning "I invited my sister to the party;" we would expect the party to be the goal of the motion of inviting, and thus party should be co-indexed with the endpoint of the backwards verb. However, the verb does not agree with the location of the party, but with the subject of the clause (1st person).

I will present the two sentences below, her system of glossing. The first is an ungrammatical sentence involving agreement with party. The second is the grammatical sentence with subject agreement. The notation "INDEX" indicates the 1st person pronoun.

39. Padden's Ungrammatical INVITE Example:

```
----------------------------- [17]
topic
----------
* INDEX SISTER, INDEX INVITE INDEX PARTY.
i 1 i j

sister PRO person j party
i 1st per. invites j
person i
```

40. Padden's Grammatical INVITE Example:

```
topic
----------
INDEX SISTER INDEX INVITE INDEX PARTY.
i 1 i 1 j

sister PRO 1st per. party j
i 1st per. invites
person i
```

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First of all, it is not at all clear that the goal of INVITE should necessarily be PARTY. This presumes that INVITE takes three arguments: an agent/source (1st person), a theme (sister) and a goal (party). It seems more reasonable, or at least a perfectly plausible alternative, to assume SISTER to be the goal of INVITE and PARTY to be in an adjunct. Even in English, INVITE doesn't obligatorily take a place as a goal: "Sue invited Mary to participate," "Sue invited everyone, but Mary," etc.. In fact, INVITE seems to select for a [+human] object/goal in ASL. The sentence above has a second possible analysis as follows:

41. INDEX SISTER INDEX INVITE [e] TO PARTY
   i 1 1 1 i j
   sister i 1st person 1 PROI person i party j
go to loc. j

Given Padden's glossing system it might not be readily apparent how jINDEX could be interpreted as TOj, but remember in the MOVE-LOC notation proposed here that the INDEX relation in identificational clauses is a TO+AT LOC string and that the g-classifier marks a neutral theme. A second thing to note is that the verb INVITE is always articulated at chest height for both source and goal, indicating that it agrees with persons not locations (see discussion of GIVE in Chapter 2). The sentence would be written in MOVE-LOC notation as follows: [17]

17. The ordering of the INDEX and NP in an identificational clause is variable. We have generally represented the INDEX as following the NP, but it is a perfectly allowable dialectal variant to find it in the reverse order. We will use Padden's ordering here.
42. 'I invited my sister to the party.'

The fact that a sentence may contain a phrase whose argument clearly receives a theta-role goal, as in the case of party above, does not necessarily mean that such a goal phrase is a direct argument of the verb. Thus, INVITE does not constitute a clear cut argument against source/goal agreement.

5.2.1.3 Evidence In Favor Of Source/Goal Agreement: Verb Doubling -

Additional evidence for Source/Goal agreement on the verb agreement can be found by examining the interaction of role prominence assignment and verb doubling. Role prominence assignment marks some external noun phrase as the person from whose perspective the action of a particular verb is to be viewed. Verb
doubling serves to allow, in a double verb construction, role prominence relations which if stated on a single verb would result in ungrammaticality. We will address two constraints on the assignment of role prominence: first, a prohibition against more than one role prominent external NP being associated with a single verb and second, a restriction that the NP with role prominence must be higher on an empathy hierarchy (specific to ASL) than any other NP with which the verb agrees.

Let us begin by examining some basic cases of role prominence assignment. This marking of an external NP for empathy or perspective is achieved by inserting into the position directly before the verb a pronominal clitic marked for role prominence and coindexed with the relevant external NP. In the examples below, three options for role prominence marking are illustrated (no marking, role prominence on the NP coindexed with the source, and role prominence with the NP coindexed with the goal):
43. ‘Sue hit Mary’ (neither Sue nor Mary marked for role prominence)

AT LOC1st per. # WARD LOC2nd per.

Mary TO-LOC , Sue TO-LOC AT-LOC #AT-LOC #LOC -FROM#TO+ON-LOC

10 20 10 20 20 10
g-classifier g-classifier g-class. r.p. clitic s-classifier

|_________|_________|_________|
ident. phrase ident. phrase object r.p. verb
clitic clitic

Mary 20 Sue 10 long thin person w/ a round solid object
obj. class. role prcm. moves from LOC20 to
(person) at LOC20 being in contact
at LOC20 with LOC10

In a sentence such as the one above, neither Sue nor Mary has role
prominence. The role prominence marker appears in every matrix
sentence, so how can neither argument be marked for role
prominence? In the above sentence, the narrator has role
prominence and the actual sentence in question is embedded within
another string (WARD LOC2nd person). This serves to mark the
entire clause as a kind of reported speech: "I say to you that..."
The role prominence marker is a part of this clause and therefore,
need not appear in the embedded one.

The next two sentences repeat the two variants of the HIT
sentence with role prominence first on Sue, then on Mary.
44. 'Sue (with role prominence) hit Mary.'

Mary TO-LOC, Sue TO-LOC AT-LOC #AT-LOC #LOC #LOC -FROM#TO+ON-LOC
\[ \begin{array}{c}
g\text{-classifier} \\
10 \\
g\text{-classifier} \\
20 \\
g\text{-class. r.p.clitic} \\
10 \\
s\text{-classifier} \\
20 \\
10 \\
\end{array} \]

Mary 10 Sue 20 person 10 role prom. from 20 to 10 person 20 by a round solid object

45. 'Sue hit Mary (with role prominence).'

MARY TO-LOC, SUE TO-LOC AT-LOC #AT-LOC #LOC #LOC -FROM#TO+ON-LOC
\[ \begin{array}{c}
g\text{-classifier} \\
10 \\
g\text{-classifier} \\
20 \\
g\text{-class. r.p.clitic} \\
10 \\
s\text{-classifier} \\
10 \\
\end{array} \]

| _________ | _________ | _________ | _________ | _________ |
| ident. phrase | ident. phrase | object | r.p. verb |
| clitic | clitic |

Mary 20 Sue 10 long thin person w/ a round solid object
obj. class. role prom. moves from LOC20 to (person) at LOC10 being in contact
at LOC20 with LOC10

In the above examples, although the ordering of the external NPs with respect to the verb and also with respect to each other is relatively free, ordering within the verb complex is very rigidly followed. As can be seen, the assignment of role prominence is not tied to any particular thematic relation. In fact, as the next two examples show, the role prominent NP need not be at all involved in verb agreement.
46. 'The ashtray fell off the table' (no marking of role prominence)

<table>
<thead>
<tr>
<th>source</th>
<th>r.p.</th>
<th>verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>topic</td>
<td>eyes averted</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AT LOC40</th>
<th>AT LOC40</th>
<th>AT LOC40</th>
<th>AT LOC40</th>
<th>LOC40</th>
<th>ON+FROM</th>
<th>TO+AT LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE</td>
<td>b-CL</td>
<td>SBP</td>
<td>curved h-CL/</td>
<td>th-CL</td>
<td>th-CL</td>
<td>curved h-CL</td>
</tr>
</tbody>
</table>

Table 40 flat negation curved a shallow rimmed object
surface of role narrow moves off of a flat
at prom. surface surface to a downward
loc. 40 marker at loc.a location

In the above example, the role prominence marker appears but is negated. The absence of role prominence must be overtly marked in this way, otherwise role prominence is understood. The sentence means something like: "The ashtray fell off the table by itself." No one caused the ashtray to fall. In the next sentence, the same interpretation holds, but since the role prominence marker which is negated is co-indexed with a person, Sue, it gets an adversative ethical dative reading: "The ashtray fell off the table on Sue, but she did not cause it to happen." "On Sue" is to be interpreted as in: "Sue's parakeet died on her" or "Sue's husband cheated on her." [18]

18. In these and subsequent examples we will put the external NPs at the beginning of the sentence without any discussion of their ordering possibilities. They could be sentence internal or discourse NPs. Either is possible.
47. 'The ashtray fell off the table on Sue.'

-------------

verb complex

<table>
<thead>
<tr>
<th>external NPs</th>
<th>source CL</th>
<th>r.p. CL</th>
<th>verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sue 50</td>
<td>Table 40</td>
<td>flat</td>
<td>role</td>
</tr>
<tr>
<td>Table</td>
<td>surface</td>
<td>prom.</td>
<td>a shallow rimmed object</td>
</tr>
<tr>
<td>40</td>
<td>at</td>
<td>at</td>
<td>moves off of a flat surface</td>
</tr>
<tr>
<td>loc. 40</td>
<td>at loc. 40</td>
<td>at location 40 to a downward location</td>
<td></td>
</tr>
<tr>
<td>loc. 50</td>
<td>loc. 50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are, however, some restrictions on what NPs in an ASL sentence can be assigned role prominence. For example, only one NP per verb can be assigned role prominence. The following sentence would be ungrammatical because it contains more than two role prominence clitics:

- 414 -
48. 'Sue hit Mary.' (where Sue and Mary both have role prominence)

---

**external NPs**

\[ \text{Sue TO LOC20} \quad \text{Mary TO LOC40} \]

- g-CL
- g-CL

(Sue 20)  (Mary 40)

---

**verb complex**

<table>
<thead>
<tr>
<th>goal CL</th>
<th>r.p. CL</th>
<th>r.p. CL</th>
<th>verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>g-CL</td>
<td>SBP</td>
<td>SBP</td>
<td>s-CL</td>
</tr>
<tr>
<td>AT LOC40</td>
<td>AT LOC20</td>
<td>AT LOC40</td>
<td>LOC20 AT+FROM TO+ON LOC40</td>
</tr>
</tbody>
</table>

(person (person (person (round solid object moves at w/ role w/ role from location 20 to and
loc 40) prom. at prom. at contacts location 40)) loc. 20) loc.40)

The only way to grammatically express the above sentence and maintain role prominence on both source and goal entails doubling the verb. Doubled verbs are two verbs, each with its own role prominence marker, which have identical themes and share a single verb complex. They get the interpretation of a single verb. But literally would be interpreted like "X verbs Y, y gets verbed." Verb doubling constructions are most common in sentences involving a 1st person and a third person. This is because ASL has a hierarchy with respect to w/ at argument can receive role prominence. First person is highest on this hierarchy. Third person is lower. In a sentence involving a first and a third person, the only way to get role prominence on the third person is through a verb doubling construction which first involves a role prominent third person acting upon some unspecified person,
followed by a role prominent first person receiving the action (e.g., third person verbs someone, first person gets verb ed). This hierarchy is discussed in a preliminary form in Kegl (1976a). The grammatical verb doubling form of the HIT sentence above is given below:

49. 'Sue hit Mary.' (Sue and Mary have role prominence—double verb const.)

```
external NPs

--------
S-u-e TO LOC20  M-a-r-y TO LOC40
  g-CL        g-CL
(Sue 20)      (Mary 40)
```

***********

verb complex

```
double verb construction

<table>
<thead>
<tr>
<th>goal CL</th>
<th>r.p. CL</th>
<th>verb</th>
<th>r.p. CL</th>
<th>source omission</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT LOC40</td>
<td>AT LOC20</td>
<td>WARD LOC40</td>
<td>AT LOC40</td>
<td>TO ON LOC40</td>
</tr>
<tr>
<td>g-CL</td>
<td>SBP</td>
<td>LOC FROM TO LOC</td>
<td>SBP</td>
<td>s-CL</td>
</tr>
<tr>
<td>chest</td>
<td>s-CL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

(person (per. w/ role prom. at loc. 40) at loc. 20) (round solid obj. (per. w/ role prom. object moves moves from near chest to some location while oriented toward location what is at loc. 40) to and contacts 40.

(hits at 40) (40 gets hit)

Notice above that when the verb splits into a double verb construction, the goal is maintained in both halves of the construction, although in the first half of the construction the
verb is embedded under a WARD LOC string, thus becoming the
imperfective "toward" rather than the perfective "to." The initial
verb in a double verb construction can have many different forms:
LOC20 FROM#TO LOC40, LOC20 FROM#TO+ON LOC40, LOC20 FROM,
or the
embedded form above. The source, however, usually gets deleted in
the second half of the construction. In fact, the same process of
source omission mentioned earlier (Padden's Agent/Subject omission)
would allow omission of the Source even in the first part of the
construction (see below):

50. 'Sue hit Mary.' (double verb construction; source omission)

external NPs

<table>
<thead>
<tr>
<th>S-u-e TO LOC20</th>
<th>M-a-r-y TO LOC40</th>
</tr>
</thead>
<tbody>
<tr>
<td>g-CL</td>
<td>g-CL</td>
</tr>
</tbody>
</table>
(Sue 20)       (Mary 40)

************

verb complex

<table>
<thead>
<tr>
<th></th>
<th>double verb construction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>verb w/ source</td>
</tr>
<tr>
<td>goal CL</td>
<td>r.p.CL omission</td>
</tr>
<tr>
<td></td>
<td>verb w/ source</td>
</tr>
<tr>
<td></td>
<td>r.p. CL omission</td>
</tr>
<tr>
<td>AT LOC40</td>
<td>AT LOC20</td>
</tr>
<tr>
<td>g-CL</td>
<td>SBP</td>
</tr>
<tr>
<td>(person at w/ role)</td>
<td>(person moves w/ role)</td>
</tr>
<tr>
<td>loc. 40)</td>
<td>(round solid object moves to and contacts location 40)</td>
</tr>
</tbody>
</table>

In the above sentence, although there is no overt marking of
Source, the sentence is still interpretable as "Sue hit Mary." Sue
has no agreement on the verb, but it is interpreted as the source or controller of the action by a process of construal. We know from agreement facts that Mary is the Goal. And, we know that the role prominence clitic is distinct from Mary and is coindexed with Sue. Furthermore, the unmarked interpretation for the s-classifier (round solid object) in the Theme slot of the verb is as a body part (fist) and body parts in the Theme generally lead to a construal of involvement in the action of the verb by some external human NP. Since Sue is not coindexed with an agreement marker on the verb and yet is marked as role prominent, this NP is crying out for some affiliation with the verb and it is, therefore, the most likely candidate to construe as the instigator of the action.

"Backwards" verbs (TAKE, STEAL, etc.) which Padden predicts should behave differently from other verbs, actually behave just like regular verbs in these double verb constructions. Their only distinction is that while Source omission is obligatory in the second verb of the construction, Source omission is not an allowable option in the initial verb of the pair. This we would argue follows from the fact that in "backwards" or "FROM-type" verbs, the focus of the action is on the Source. The following series of examples illustrates the possibilities for role prominence marking for the verb TAKE.

In these examples, three external NPs are involved. As a rule, ASL resists the piling up of three or more independent external NPs before a single verb. The NPs would normally be introduced in two or more separate utterances and then associated with the verb "TAKE" through the process of coindexing with the
Source, Goal or role prominence marker. "BOOK," however, because in this case it is unindexed, would be introduced in the same sentence; in fact, it would be incorporated into the verb. If BOOK however were definite or were modified it would constitute a separate external NP. We will put ellipsis marks between the external NPs and the actual sentence:

51. 'Sue took a book from Mary.' (role prominence on Sue)

---

external NPs

\[
\begin{array}{c}
\text{Sue TO LOC20} \quad \text{Mary TO LOC40} \\
\text{g-CL} \quad \text{g-CL} \quad \ldots \\
\text{(Sue 20)} \quad \text{(Mary 40)}
\end{array}
\]

---

verb complex

\[
\begin{array}{c}
\text{r.p. CL} \quad \text{verb} \\
\text{AT LOC20} \quad \text{AT LOC0} \quad \text{LOC40 WARD\textsubscript{G} FROM\textsubscript{G} TO\textsubscript{G} WARD LOC20} \\
\text{SBP} \quad \text{BOOK} \quad \text{grasping classifier} \\
\text{(person w/ role prom. book) (a grasping motion moves from location 40 to location 20)}
\end{array}
\]
52. 'Sue took a book from Mary.' (role prominence on Mary)

---

**external NPs**

[Sue to LOC20] [Mary to LOC40]

(Sue 20) (Mary 40)

---

**verb complex**

|r.p. CL| verb
|---|---
| incorporated
noun| verb

<table>
<thead>
<tr>
<th>AT LOC40</th>
<th>AT LOC0</th>
<th>LOC40 WARD+FROM TO+WARD LOC20</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP</td>
<td>BOOK</td>
<td>grasping classifier</td>
</tr>
</tbody>
</table>

(person w/ role prom. at loc. 40) (book) (a grasping motion moves from location 40 to location 20)
53. 'Sue took a book from Mary.' (double verb construction)

---

**external NPs**

\[
\begin{array}{c}
\text{S-u-e TO LOC20 M-a-r-y TO LOC40} \\
g-\text{CL} \quad g-\text{CL} \quad \ldots \\
(\text{Sue 20}) \quad (\text{Mary 40})
\end{array}
\]

---

**double verb construction/verb complex**

\[
\begin{array}{c|c|c|c|}
\text{r.p. CL} & \text{verb} & \text{r.p. CL} & \text{verb} \\
\hline
\text{incorporated noun} & \text{at LOC40} & \text{loc40 WARD+FROM TO+WARD LOC20} & \text{at LOC20 TO+ON LOC20} \\
\hline
\text{SBP BOOK} & \text{grasping classifier} & \text{SBP} & \text{grasping CL} \\
\hline
\text{(person w/ role prom. at loc. 40)} & \text{(a grasping motion moves from location 40 to location 20)} & \text{(person w/ role prom. at loc. 40)} & \text{(a grasping motion moves to and in contact w/ what is at location 20)}
\end{array}
\]

\[
\begin{array}{c}
\text{[role prom. [book] [person 20 takes something from person 10]} \\
\text{[role prom. on Sue]} \\
\text{[Sue gets something]}
\end{array}
\]

In the last example above, several interesting things can be noted. First, although according to Padden's description the Subject or Agent is the Goal, both the ordering within the verb and the order in which role prominence is assigned within the double verb construction is Source-Goal:

---

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SOURCE-GOAL ORDERING IN THE VERB:

\[
\text{LOCi Term}\text{FROMTO Term LOCj}
\]

\[
\begin{array}{ll}
\text{source} & \text{goal} \\
\end{array}
\]

Figure 5.

SOURCE-GOAL ORDERING IN ASSIGNMENT OF ROLE PROMINENCE FOR DOUBLE VERBS:

\[
\begin{array}{l}
[r.p. CL verb r.p. CL verb] \\
\text{source} & \text{goal} \\
\end{array}
\]

(for both regular and "backwards" verbs)

Figure 6.

The "backwardness" Padden attributes to these verbs seems clearly to be an artifact of the English gloss, TAKE, and the baggage carried with it. Neither the morphology nor the syntax of ASL seems to treat these verbs as "backwards." It seems feasible to consider the possibility that agreement of LOCs on the verb in ASL is stated on the basis of thematic relations (source and goal), rather than on grammatical relations (subject, object); and certainly that Agent is not among the set of primitive thematic relations overtly marked on the verb. As can be seen in the schema below, only a statement of ordering and agreement in terms of source and goal can capture any significant generalization concerning the facts in ASL.
Also, notice in the examples involving verb doubling that source omission, not agent or subject omission is required in the second portion of a double verb construction. No distinction is made here between so-called "backwards" verbs and regular verbs. In fact, introduction of such a distinction serves only to obscure the facts. The only distinction which does exist concerns the optional deletion of source in regular verbs in the initial verb of a double verb construction whereas in "backwards" or FROM-type verbs the source agreement slot must remain when the external NP coindexed with the source agreement marker is assigned role prominence. This, again seems to fit with the fact that FROM-type verbs focus on the source.

To sum up, it seems that although double verb constructions result from restrictions on the occurrence of two role prominence markers (which will later be shown to be tied to nominative case marking), the ordering in these constructions is sensitive to source and goal rather than agent or subject. The language resists omission of Goals. FROM-type verbs additionally resist full omission of the source agreement slot except in cases where it has
been previously stated in the initial portion of a double verb construction.

When we see that what Padden has called verbs with Agent or Subject omission are in reality verbs lacking a goal or source, yet still taking an agent argument in the clause, it becomes clear that such relations are not marked by the LOCs on the verb. Basically, they involve a process of construing a nominal that need not agree with the verb as controlling the process or action of the verb. This process takes us to the notion of Agency, and it precisely does not involve an agentive slot on the verb.

5.2.2 Causative Marking And The Construal Of Agency [19]

The notion of an agent is logically independent of a notion of source, but nonetheless it gets caught up with this notion in the following way: Agents, as the controller of the process or action named by the verb, are often located at the source locations, since this is a way to exert control. But this is not necessary. In an example like "Sue moved the book from the table to the chair," the agent is not at the source position, though the agent's hand is—and we will see that this latter fact is important in ASL.

The notions of agent and patient are handled quite differently in ASL than are source and goal. One way to understand what ASL does is to start by looking at a common source of object markers and transitivity markers in a number of languages. In Mandarin,

19. Much of this section is a revision and reanalysis of work originally presented in a preliminary form in Kegl and Gee (1983).
for example, a patient marker ("ba", which occurs before the patient) has grown out of a verb meaning "take hold of." The "ba" sentence form now marks highly transitive complex actions which affect concrete patients. It used to be a serial verb construction.

\[ \text{Wo ba yu chihao.le} \]

I patient fish eat finish perfective
(I took hold of a fish and ate it up.)

"I've eaten up the fish."

Though this "ba" is no longer a verb, it retains semantic traces of its former identity. A sentence like the one below is ungrammatical, presumably because objects of experience verbs cannot be "taken hold of":

\[ \text{Wo ba yu kan.le} \]

I patient fish see perfective

"I've seen the fish."

A verb meaning "take" or "hold" has given rise, out of serial verb constructions, to an object/patient marker in a large number of languages, particularly in a number of African languages. When this "take/hold" verb is used with verbs of location or motion it has tended to become a transitive or causative marker. Consider, for example, the case of Akan and Ga (Benue-Kwa languages). In Akan the used to be a verb meaning "take, hold, possess, use." In Ga
KE [20] used to be a verb meaning "take." Today both morphemes are case marking prepositions, marking such (related) roles as patient, instrument, manner and commitative. In the examples below we place in parentheses the readings the sentences would have had when the de/ke morphemes were serial verbs.

AKAN:
----

54. "He stood a lamp on the table."
-------------------------------
)
\ / de kanea bi sii pono no so
he-(de) lamp certain stood table that top
(he took a lamp and stood it on the table)

55. "Kofi took Amma away."
---------------------------
Kofi de Amma ke)
Kofi (de) Amma went
(a. Kofi took Amma and (Kofi) went)
(b. Kofi took Amma and Amma went)

56. "Kofi has brought the book."
-----------------------------
Kofi de nwoma no a-ba
Kofi (de) book that perf-come
(Kofi took the book and he/it came)

20. Due to the limitations of the word processor, I will use "E" to represent mid front rounded vowels, "")" to represent mid back rounded vowels, and "ng" in place of angma for velar nasal consonants.
57. "Tete came with the book." or "Tete brought the book."

---

Tete (kE) book the came
(a. Tete took the book and he came)
(b. Tete took the book and it came)

she (kE) book lay-down
(she took a book and it lay down)

"She put down a book."

In each of these sentences we have an intransitive clause
(e.g. the lamp stood on the table, the book came, the book lay
down) to which has been added a verb meaning 'take/hold/take hold
of.' This has a dual result. The subject of the intransitive
clause (e.g. the lamp, the book), which is a Theme (the entity
that moves or is located), is marked as a patient, but a patient in
the sense of being taken hold of. And the "take" verb adds another
participant to the clause, an Agent, but an Agent in the sense of
one who takes hold of. So we start from something like the example
(b) below:

58a. The lamp stood on the table.

58b. Kofi took the lamp, (it) stood on the table.

Here the relationship between the taking/holding of the lamp and
its standing on the table is not overtly stated, but left to
discourse construal. Thus note the ambiguity of the serial verb readings of the second and third Akan sentences given above. The second sentence can mean: Kofi took Amma and Kofi came = "Kofi came with Amma" or Kofi took Amma and Amma came = "Kofi brought Amma". The third sentence shows a similar pattern. Eventually (in cases where the object of "took" is the subject of the motion/location verb), the "take" verb comes to be understood as the grammatical marker of either patienthood or objecthood. Once this happens, the subject of "took" is understood as the subject of "stand," thus transitive-vizing this verb.

58c. "Kofi stood a lamp on the table."

Kofi obj-lamp stood on the table

In Akan the motion/location verb is in fact still intransitive in the sense that the object marked NP, the one marked by de, cannot occur post-verbally, despite the fact that Akan is otherwise SVO. The situation in Mandarin is similar.

The situation in ASL is similar to the ones we have just surveyed, but also suggestively different. Consider the sentences below:
59. "Sue moved the book from here to there."

60. Sue gave a book to Mary.

21. The b-handling classifier involved in this sign reflects the reciprocal proximity relation which marks handling a thick object. For a discussion see Chapter 2. The full form of this classifier is repeated below:

RECIPROCAL PROXIMITY RELATION (thick size)

22. I have not fully notated the orientational properties of this sign. It is oriented away from the signer and the hand is held in a vertical position; where the thumb and edge of the index finger are uppermost. This aspect of orientation is not consistently reflected in the signs presented thus far. For a detailed discussion of the types of orientations possible see Kegl and Wilbur (1976) and Supalla (1982, 1985).
These verbs all contain "handling classifiers." ASL has a set of specific handling classifiers that simultaneously specify a handler, a way of handling and the size and shape of the object handled. (See the "move" and "put" sentences above.) It also has a general handling classifier that just signifies "handling" without specifying anything more specific. (See the "give" sentence above.) The handling classifier is embedded in the motion of the verb, a position that is overtly tied to the notion of a theme. Since "Sue" need not agree with the verb in the sentences in in the first two sentences above, though it may if it is taken as source; there is need for a rule that construes "Sue" (LOC70) as designating the one who does the handling or grasping specified by the handling classifier. This rule also has to pick out the object handled, which in the case of the specific handling classifiers is directly signalled in the verb (a book takes a different handling classifier than a cup does). Thus, the handling classifier simultaneously marks an agent in the sense of a handler or grasper and a patient in the sense of a thing taken hold of and manipulated—just as "take/hold" did in Akan and Ga. These can be taken to be, in fact, the root or cognitively basic meanings of agent and patient (from which these notions are extended in various directions). Thus a sentence like the "put" sentence above is better glossed as: "A book moves onto something at location 22 by being handled or grasped by Sue."

Lord (1982:296) suggests that the basicness of holding has its roots in the development of the child: "The growing child spends a lot of time 'taking' things, grasping objects manually and moving
them around." She also points out that Slobin (1982) suggests "that object manipulations, in which a causal agent brings about a change of state or location by means of direct body contact, is a 'prototypical event' with significance in the development of language from sensorimotor cognition in early language development." Finally, she claims (p. 297) that "the child's act of grasping and moving a physical object defines his earliest coded patient category." And it can be added that the child's own grasping is his or her earliest coded agent category. Thus, one basic set of transitive clauses in ASL involve a double structure such as the handling classifier which simultaneously signals the presence of both an agent and a patient.

ASL displays a contrast among several different roles that have been collapsed in the notion Agent. In a sentence like "Sue hit Mary," ASL uses a classifier in the FROM NT TO ON verb for a round solid object. Sue is an agent in the sense that she is a person at the source of motion and in that she contributes a body part to the motion (fist). She does not handle anything, but rather directly acts. In a sentence like "Sue walked," ASL incorporates into the verb a classifier for a person-by-legs. Sue is in motion, in this case in all likelihood under her own control. Finally, we have seen that for sentences like "Sue put the book on the shelf," ASL incorporates a handling classifier on the verb. We have then three senses of agent:
61a. Person at source contributing body part (e.g. hit)

61b. Person as moving (e.g. walk)

61c. Person as handling (e.g. put)

It is sense (c) that is a prototypical agent/causer—in the other cases. Note that a manner adverbial like "carefully" that implies control is only really fully at home in the (c) cases:

62a. ?? Mary carefully hit (kicked, slapped) Sue.

62b. ?? Sue carefully ran (walked, moved) to the store.

62c. Sue carefully placed (put) a book on the shelf.

Sue carefully opened the door.

Sue carefully moved the cup across the table.

We can, finally, note that in no case does the notion of intentionality or volitionality play a direct role in the notion agent. More important are the notions of being at the source, contributing a body part, controlling a movement, and most of all, taking hold of something.

ASL is particularly illuminating when it comes to the notion of "theme" (in thematic role terms "theme" = the NP that names the entity that moves or is located). The ASL verb contains a particular "slot" for the Theme. In any verb—transitive or intransitive—a nominal or classifier must be articulated concurrent with the movement of the verb. This incorporated element always stands for the theme. However, ASL shows that
"theme" is a much richer notion than has previously been indicated in the literature on semantic/thematic roles. Consider, once again, the ASL sentence below:

63. "Sue put the book on the shelf."

Here we have a handle classifier incorporated into the verb. The classifier, in this case, classifies the book as the theme (the handled object). But it also clearly indicates that the theme is, in examples like this one, connected with a part of the agent. Thus, the theme here is really "a handled book", as opposed to the situation in a sentence like the one below, where "the book" alone is the theme:
64. 'A piece of paper is on the table.'

In the example above, we have a classifier classifying, not a way of handling objects, but the objects themselves. Thus, we might say that an English sentence like "Sue put the book on the shelf" means something like "Sue placed the book by (using) her is hand (or some other instrument) on the shelf", with the underlined portion being the whole theme. Or, consider once again the ASL sentence meaning "Sue hit Mary":

65. 'Sue (with role prominence) hit Mary.'

Here we have an incorporated classifier for round solid objects. The ASL sentence shows that the English sentence "Sue hit Mary" means something like "Sue gave a blow with her fist (or other instrument) to Mary", where the underlined portion is the whole
Theme. Notice too that there is an important difference between "Sue put the book on the shelf" and "Sue hit Mary", if we accept the ASL sentences as translations of these English sentences. In the first case the direct object of the English sentence ("the book") is involved in the statement of the theme ("a book using his hand"), but in the second case the direct object ("Mary") is not involved in the statement of the theme ("a blow with his fist"). This difference shows up systematically in English. Only NPs that are involved in the statement of Theme can give rise to passive—adjectival sentences that have a completely stative interpretation:

66a. Is the book put back in its place?

66b. *Is Mary hit by Sue?

ASL shows that if we add an agent to a sentence, the theme takes on an inherent instrumental addition to its meaning. The complex nature of the theme is yet more apparent if we look at cases like the ASL sentence meaning "Sue got a rock to the dump by repeatedly pushing it":
Here we get a series of recursively embedded themes—all finally embedded in the main TO+ON LOC string. At the lowest level of embedding we have the b-classifier for flat surfaces (hands). This final classifier puts an end to the recursion. The meaning "Sue got a rock to the dump by repeatedly pushing it" has a main movement with a set of sub-movements embedded in it. The theme means something like "hands on round surface repeatedly moving to a goal". That is, the theme is not just an object or object-instrument combination, but an object-instrument combination (but an object-instrument combination that is itself a clause: the rock is LOC of ON, and hands/instrument is the theme of ON) embedded in a pattern of sub-movements (TO-iterative) to a goal. The theme, then, is quite complex. English cannot state this meaning in a simple manner. But in the abstract realm, English has a verb like "encourage" which has a nearly identical lexico-semantic complexity. ASL shows a great deal of this structure in its version of "encourage":

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68. ENCOURAGE:

"Encourage", as ASL makes clear, means something like "to repeatedly push someone in a psychological sense to do something" (it is easy to prove that English "encourage" has iterative aspect built into it. In the progressive, a verb like "push" does not allow for completion of the process it denotes, thus, "(at time t) Sue was pushing the rock to the dump" does not allow for the possibility that "(at time t) Sue (had) pushed the rock to the dump". But "(at time t) Sue was encouraging Mary to leave" does allow for the possibility that "(at time t) Sue (had) encouraged Mary to leave". This is so because "encourage" involves repeated motion to the same point, so to speak). Thus, in an English sentence like "Sue encouraged Mary to leave" it is completely inadequate to say that "Mary" is the Theme. The situation is much more complex. What moves (figuratively speaking) between Sue and Mary is "repeated pushings (figuratively speaking) of Mary to leave" and there is a sub-Theme embedded in this larger Theme.

23. Metaphorical extensions to a non-literal Domain often involve a change from TO-ing to WARD-ing, as in the example above. This serves to eliminate the literal sense of path from the word.
namely "hands" (figuratively speaking) on Mary.

What emerges after this brief discussion of theme is the view of theme as a figure in a complex Figure-Ground construction denoted by the verb (actually, the clause or verbal clause in ASL). As in visual perception, the Figure may be quite complex, itself having a (sub-) Figure-Ground construction. This immediately suggests the hypothesis that the meanings of clauses are in reality structured like the Figure-Ground structures of visual perception, even in the abstract realm. Thus, we hypothesize that the lexico-semantic sub-structure of words is inherently "iconic" and especially iconically related to vision.

The basic ASL clause has the following sort of structure, if looked at in Figure-Ground terms:
"A cup is on the table." [24]

Figure 8a.

24. There is no need to sign the indefinite form of the sign CUP in this example because "cup" is the unmarked interpretation of the rimmed object classifier.
'Sue hit Mary' (role prominence on Sue)

The ground is a complex made up of a fixed point (the ground clitic, which comes first among the clitics) and an overall FROM TO movement. The figure is a complex of an agent/handler, a moving object, and an instrumental connection with the agent handler.

Figure and Ground play a prominent role in ASL grammar. One aspect of the grammar which can be nicely stated in terms of these notions is the occurrence of the non role prominence clitic which if present is the initial element of the verb complex:

```
   verb complex
    | ------
    |  clitic  (clitic)  verb \\
    | ------
    | role
    | prominent
```

The question we might ask about the initial clitic boxed in the
diagram above is: What relation (grammatical, thematic or otherwise) does this clitic hold with respect to the verb?

A quick look at intransitives quickly disabuses us of any notion that this clitic bears any one thematic relation to its verb. Consider the three examples below (on the left is a schema of the clitic and verb, and on the right, an example giving just the verb complex; the translation is an example sentence that would contain such a verb complex):

**SCHEMA:**

69. 'The cup is on the table.'

\[
\begin{array}{c}
\text{Clitic V} \\
\mid \\
\text{location} \\
\end{array}
\begin{array}{c}
\text{AT LOC20} \\
\mid \\
\text{b-CL} \\
\end{array}
\begin{array}{c}
\text{ON LOC20} \\
\mid \\
\text{o-CL} \\
\end{array}
\]

(flat surf. (rimmed object is on at loc.20) what is at loc. 20)

70. 'Sue went up to Mary.'

\[
\begin{array}{c}
\text{Clitic V} \\
\mid \\
\text{goal} \\
\end{array}
\begin{array}{c}
\text{AT LOC40} \\
\mid \\
\text{g-CL} \\
\end{array}
\begin{array}{c}
\text{TO+AT LOC40} \\
\mid \\
\text{g-CL} \\
\end{array}
\]

(long thin (long thin object obj. person) moves to is at loc.20) location 20)

71. 'The prisoner escaped.'

\[
\begin{array}{c}
\text{Clitic V} \\
\mid \\
\text{source} \\
\end{array}
\begin{array}{c}
\text{AT LOC50} \\
\mid \\
\text{v-CL} \\
\end{array}
\begin{array}{c}
\text{LOC50 IN+FROM} \\
\mid \\
\text{g-CL} \\
\end{array}
\]

(width extension)
[4-classifier]
(parallel lines)

(parallel long (long thin object thin objects) moves away from at loc. 50) confinement at loc.50)

- 441 -
In each example above, the clitic bears a different thematic role with respect to its verb (pure location, goal, source). Of course as has been argued elsewhere (see Gee and Kegl (1982a, b), Kegl and Gee (1983) and Section 1 of this chapter), the basic relation locative argument marker (LOC) holds to a motion/location is simple location. Source and goal are secondary notions which follow from the nature of the relation between the root and the terminator. Therefore, we might simply want to say that the clitic holds the basic locative relation with respect to its verb. This works fine for single LOC forms which have only a single argument, but cannot account for the clitic which occurs with double LOC forms. In such verbs there is only one non-role prominence clitic, but these verbs have two locative agreement markers (LOC FROM TO LOC).

Consider four more examples which indicate that only one clitic (goal) can appear in double LOC verbs:

\[
\begin{array}{cccc}
\text{SCHEMA:} & \text{EXAMPLE:} \\
\hline
\text{---------} & \text{---------} \\
72a. & 'Sue hit Mary' (clitic agrees with goal) \\
\end{array}
\]

\[
\begin{array}{ccc}
s-CL \\
g-CL \\
\hline
\text{Clitic V} \#V \\
goal \\
\end{array}
\]

\[
\begin{array}{ccc}
\text{LOC90} & \text{LOC10 FROM TO ON LOC90} \\
\hline
\text{AT} \\
\hline
\end{array}
\]

(long thin object (person) moves from loc. 10 to loc. 90) (sound solid object and contacts loc. 90)
"Sue hit Mary" (clitic agrees with source)

\[\text{Clitic V} \# \text{V} \quad \begin{array}{c}
\text{AT LOC10} \\
\text{LOC10 FROM TO ON LOC90}
\end{array}\]

\(\text{g-CL} \quad \text{s-CL}\)

(long thin 
obj. (person) is at loc. 10) 
(sound solid object 
from location 10 to 
and contacts loc. 90)

"John walked from the house to the car."

\[\text{Clitic V} \# \text{V} \quad \begin{array}{c}
\text{AT LOC30} \\
\text{LOC30 AT FROM TO AT LOC50}
\end{array}\]

\(\text{b-CL} \quad \text{v-CL} \quad \text{down}\)

(vertical flat 
(parallel long thin 
surface is at 
objects (person-by-
location 30) moves from 
loc. 30 to loc. 50)

(clitic is \(\infty\)-indexed with the source)

In these examples we see that the clitic which appears initial in a
do double LOC verb complex is \(\infty\)-indexed with the goal. From this
limited set of data we might hypothesize that the initial clitic is
an absolutive marker. In ASL, basic verb stems are all
intransitive and the FROM base form which facilitates the presence
of a source marker functions in complex stems as a transitiveizer.

\text{TRANSITIVITY RELATIONS IN ASL:}
--------------------------------------

source of a transitive = ergative

\(\text{nonsource agreement in a transitive} \quad \text{\textbackslash} = \text{absolutive}\)

agreement marker of an intransitive/

Figure 9.
All of the clitics in the above examples could be absolutive markers:

```
Clitic ON
     | locative
     | (abs)

Clitic TO
     | goal
     | (abs)

Clitic FROM
     | source
     | (abs)

Clitic FROM TO
     | goal
     | (abs)
```

Figure 10.

With these data we might conclude that ASL has an ergative/absolutive case marking system where arguments of intransitives and transitive "goals" are absolutive. This would lead us to question the transitivity of the following example which appears to have two LOC and thus might be identified as a transitive verb with a preceding source clitic.
We would expect to find either no clitics or a goal clitic, but instead a source clitic appears. Source clitics are expected only with intransitives. The following example sheds some light on this problem. The ASL sentence for "she jumped from the table to the chair" at first glance seems doubly problematic; not only does a source clitic appear, but a goal clitic also surfaces. This clitic is realized not before the verb but appears temporally at the midpoint of articulation of the verb and perseverates to serve as the final contact point of its movement. This is possible because the two clitics are signed with the left hand and the verb with the right. See Simmons de Garcia (1982) for additional discussion if such forms.
The line between the two themes (the b-Classifiers) indicates theme chaining, a phonological blending of two like themes when articulated in sequence by the same hand. The effect is that rather than appearing as two separate locative signs (AT LOC20, AT LOC40) the b-classifier appears to move from LOC20 to LOC40. Any unity between these two elements is purely phonetic. In fact, we could argue that theme chaining is occurring on the right hand as well in both of the following examples. In both cases we have not transitive verbs, but sequences of 'intransitives whose themes are chained. Thus, these complex examples reduce to simple sequences of (Clitic)Verb(Clitic)Verb. In the first example below, a clitic does not appear in the second verb; probably because its LOC is unindexed and associated with a direction. Below are the proposed representations for these intransitive verb sequences:
75. 'A cup fell down off of the table.'

verb complex                verb complex

|   CL    V   ||   CL    V   |
|          ||          |

Clitic V#V                  AT LOC80  LOC80  ON+FROM  $  TO+AT LOC$  \
| source  WARD LOC  c-CL    c-CL down  \
|         |            |
| b-CL  down                    theme chaining

(flat surface is    (rimmed object moves off  \
  at location 80) of what is at location 80  \
and moves downward)

76. 'She jumped from the table to the chair.'

verb complex                verb complex

|   CL    V   ||   CL    V   |
|          ||          |

[CL V]  [CL V]  AT LOC20  LOC20  ON+FROM  AT LOC40  TO+ON LOC40
| source  goal  b-CL  WARD LOC  b-CL  WARD LOC
|          |            | v-CL  down  v-CL  down

theme chaining

(left hand) (right hand) (left hand) (right hand)

theme chaining

(flat surface (person by (flat surface (person by 
  is at   legs moves   is at   legs moves  
  location 20) off of what location 40) onto what  
  is at   is at   location 20) loc. 40)

Perhaps: "She jumped off of the table and onto the chair"
Reanalysis of these examples allows us to maintain the hypothesis that the presence of the clitic is actually conditioned by some grammatical relation (absolutive). However, another characterization of the facts also seems to account for the existence or non-existence of the non-prominence clitic—the distinction between figure and ground. In all the examples above, the non role prominence clitics share in common the fact that they serve as the ground for the action of the verb. See the Figure below:

![Figure-ground relations in the verb complex](image)

**Figure 11.**

There is one figure-ground relation between the LOC (ground) which serves as the anchor point for the moving or locating of the theme (figure). This clitic serves as a ground for the action or relation specified by the verb. Notice in a compound or complex verb that the source has a more transitory role than the goal which serves as an anchor point of the movement. Therefore, it is expectable that goals would be more "groundlike" than sources. Interestingly, "backwards" verbs which tend to focus on the source might be expected to treat the source more as an anchor point (i.e. ground). We see this in signs for "learn from a book" and "eat soup" which are compound verbs (or even possibly reanalyzed as
complex source-goal verbs) whose source can be viewed as a concrete container. This is true of these forms whether they serve as the matrix motion/location string (i.e., the non-idiomatic case) or are embedded within an AT LOC string (the idiomatized version). We will give the literal versions below:

77. 'eat soup'

\[
\begin{array}{l}
\text{Clitic Vhw} \quad \text{AT LOC20} \quad \text{ON+FROM\to+AT LOC40} \\
\quad \longleftarrow \quad \text{WARD LOC} \quad \longleftarrow \quad \text{h-CL} \\
\quad \longleftarrow \quad \text{c-CL} \quad \longleftarrow \quad \text{up} \\
\quad \longleftarrow \quad \text{mouth} \\
\end{array}
\]

78. 'learn from a book'

\[
\begin{array}{l}
\text{r.p. CL} \quad \text{source CL} \quad \text{verb} \\
\quad \longleftarrow \quad \longleftarrow \quad \longleftarrow \\
\text{Clitic Vhw} \quad \text{AT LOC40} \quad \text{AT LOC20} \quad \text{AT LOCa LOC20} \quad \text{ON+FROM\to+AT LOC40} \\
\quad \longleftarrow \quad \text{SBP} \quad \longleftarrow \quad \text{WARD LOC} \quad \longleftarrow \quad \text{th-CL/b-CL} \\
\quad \longleftarrow \quad \longleftarrow \quad \longleftarrow \quad \text{WARD LOC} \quad \longleftarrow \quad \text{forehead} \\
\quad \longleftarrow \quad \longleftarrow \quad \longleftarrow \quad \text{TO+ON LOC down [recip]} \\
\quad \longleftarrow \quad \longleftarrow \quad \longleftarrow \quad \text{b-CL/th-CL} \\
\end{array}
\]

\[
\begin{array}{l}
\text{role prom (curved/rimmed obj.} \\
\text{at loc.40)} \quad \text{(a clamping hand moves from} \\
\text{at loc.20) contact with what is at loc. 20} \\
\text{to proximity with the forehead} \\
\text{at location 40)} \\
\end{array}
\]

When the source is a person or thing which is at the source but not the tangible source itself, the clitic does not appear. Compare "learn from a book" above with "learn from a person" in the example below:
Evidence which clearly distinguishes between an absolutive clitic vs. a ground clitic, however, comes from some simple intransitives involving FROM. As we saw earlier, intransitive FROM can occur with a clitic. In all these cases the clitic serves as a ground for the verb. It is either the container or the base from which a movement originates. Consider the following three examples involving "a cup" and the verb "steal":

(a clamping hand moves from contact with what is at loc. 20 to proximity with the forehead at location 40)

(role prom at loc. 40)
80. 'She stole something out of the cup.'

\[
\text{verb complex} \\
\begin{array}{c|c|c}
\text{external NP} & \text{ground CL} & \text{verb} \\
\hline
\text{AT LOC70} & \text{AT LOC70} \# \text{LOC70 IN+FROM} & \\
\text{CUP} & \text{c-CL} (\text{opposed}) & \text{TO+ON LOC} \\
& & \text{bent v-CL} \\
\end{array}
\]

Cup 70 (a rimmed object is at loc. 70) (a grasping motion by the index and middle finger moves out of what is at loc. 70

("cup" is the ground)

81. 'She stole the cup.' (ungrammatical)

\[
\text{verb complex} \\
\begin{array}{c|c|c}
\text{external NP} & \text{ground CL} & \text{verb} \\
\hline
\text{# AT LOC70} & \text{AT LOC70} \# \text{LOC70 AT+FROM} & \\
\text{CUP} & \text{c-CL} (\text{opposed}) & \text{TO+ON LOC} \\
& & \text{bent v-CL} \\
\end{array}
\]

Cup 70 (a rimmed object is at loc. 70) (a grasping motion by the index and middle finger moves away from what is at loc. 70

("cup" as figure/theme; the co-indexing of "cup" with a ground clitic renders the sentence bad)
82. 'She stole the cup.' (grammatical)

---

verb complex

[Diagram of verb complex structure]

CUP

(External NP)

AT LOC70

Cup 70

(a grasping motion by
the index and middle
finger moves away from
what is at loc. 70)

("cup" as figure/theme; there is no ground clitic
co-indexed with it)

In the first sentence above, the clitic is clearly a ground. It
serves as the container from which the action originates. The next
sentence is bad because the clitic serves as the figure with
respect to the verb. If the cup is stolen, the cup moves.

However, the third example represents this same sentence without
the clitic and is perfectly acceptable; and clearly interpretable
as stealing the cup itself. It would not be interpreted as stealing
from the cup (as a ground).

There are some variants of this sentence which should be
mentioned. First, because the unmarked interpretation of the
"rimmed object classifier" is "cup," there is really no need to
sign an independent NP for CUP. Second, it is also possible to
sign what looks like the classifier as an external NP. This form
is a one handed variant of CUP. In all these cases, however, it
still holds that the rimmed object classifier cannot perseverate
throughout the signing of STEAL; i.e., appear in the position of the ground clitic. [25]

5.3 CONCLUSION

The occurrence of the classifier clitic, appears not to be dependent upon any specification of grammatical relations (subject/object, ergative/absolutive). It can be most simply stated in terms of figure and ground; a notion central to the grammar of ASL. However, this does not preclude its also functioning as an object marker, as we will see in Chapter 6. It is just that the object marker only occurs with non-theme objects. In all other respects to will be shown to function as a legitimate case marker as well as a ground clitic.

When we get to the notions of agent, patient, and theme; then, it seems clear that the organization of language is ultimately the metaphysics that underlies it. Semantic roles are, ultimately, not discrete categories, but cover a metaphysical system of a great deal of intricacy and complexity. This system is ultimately connected to and founded on the "metaphysics" that underlies our visual/spatial "world." But whatever the case may be, this system undoubtedly goes far beyond the confines of linguistic theory proper.

While semantic roles ultimately give rise to "metaphysics", we

25. A discussion of the hierarchies relating to the occurrence of role prominence markers and the ordering of elements and co-occurrence of elements following from restrictions on figure-ground relation can be found in Kegl (1984).
should point out that this is not the situation for thematic roles or morphological case marking. In terms of a system of thematic roles, ASL is maximally simple. The simple verb stems all take one argument which can simply be characterized as LOC (no need for further detail, since the roots themselves specify the further detail). ASL, in fact, indicates that the ontological and logical basis of the notion of "argument" is a deictic point, i.e. a "logically proper name" in Russell's sense). The transitivity process (rule) in ASL assigns to the LOC of FROM in a complex sign (as opposed to a compound), the further case "Transitive Subject" or "Transitive ARG;" or, better, simply ERG(ative) (see Hopper and Thompson for arguments that it is the inclusion of an "agent" that most contributes to the transitivity of a clause). We suggest that the maximally simple system is in fact one where the verb governs one argument and assigns it the relation ARG (which is foundationally a locative notion) and where the clause as a whole assigns one additional case, which is basically transitive subject or ERG. It is these simple points--structural functions in the grammar--that are ultimately tied into a complex metaphysical system hooked up to the conceptual system encoded in lexical semantics, particularly the lexical semantics of verbs.
CHAPTER 6
CASE MARKING AND CO-REFERENCE RELATIONS

It has been argued that American Sign Language is "semantically perspicuous." The original claim made was made in Gee and Kegl (1982a,b; 1983). There we characterized "semantic perspicuity" as a near one-to-one mapping, or isomorphism, among phonetic, morphological and semantic representations. This was not a claim that signs "look like" what they refer to, rather it is a claim about the structural relationships between levels of representation. The use of the term "semantics" was a bit problematic, since as we have seen the lexico-semantic primitives which comprise the ASL sign are in no way meaning units that combine to yield the true "meaning" of any given sign. Particularly, the components of embedded themes, which themselves can be systematically associated with some motion/location or shape related meaning, and whose configuration yields its own interpretation, do not reflect the meaning of the sign as a whole. In fact, they prove to be more like idioms.
Still, if we examine each level of embedding on its own, it appears that for each part of what is plausibly a correct lexico-semantic analysis, ASL has a separate morpheme, and these morphemes are combined in ways that plausibly fit the way the lexico-semantic components are combined. The morphological structure of the complex sign is built up in the lexicon. Thus, we are arguing that there is a close fit between the lexical-morphological representation of the sign, its (underlying) phonetic and its lexico-semantic representation. Of course, this sort of close fit of phonetic representation and semantic representation is possible only for locational/directional meanings. Other more abstract signs use the same morphology, but figuratively extend the meanings of the locational/directional morphemes. In these cases, we can see how linguistic labels for abstract realms of meaning use locational/directional meanings as a template. This has been argued to be in fact the case for all languages "Locative Hypothesis." ASL is simply in the position of being able to reflect these basic locational/directional meanings very directly in its phonetic form.

In a wide range of cases, the S-structure of an ASL sentence closely resembles representations typical of the level of logical form (LF), or at least representations typically associated with first order languages. [1] Further, the phonetic form of the ASL sentence reflects the elements of this representation in a very direct way. This is just the analogue in the syntax of the picture

1. This issue takes us beyond the scope of this discussion. For a more detailed discussion of the issue see Gee and Kegl (1983) and Kegl (in preparation).
we have already delineated at the level of the lexicon. In the basic case, a locative argument marker (LOC) in ASL behaves like a logical variable. Furthermore, quantificational structure in ASL is highly unmarked. There are no variable binding ambiguities. In fact, except for clitic climbing which involves movement at PF, it seems that S-structure, LF and PF are nearly isomorphic. What does that mean? Basically, it implies that there is no abstract movement (e.g QR) at LF which is not apparent at PF. The positioning of quantifiers which corresponds to the logical form of the sentence is evident at S-structure. Hence, there is a drastic reduction in the incidence of scope ambiguities present in the language.

ASL is quite different in structure from English. There is currently a great deal of controversy as to whether ASL has any significant amount of syntactic embedding, and if so, how much and of what sort. However, nearly everyone now agrees that ASL has a good deal of morphological complexity. Further, it is clear that ASL is a discourse sensitive language. In fact, it has a good number of the properties that have been associated with "non-configurational languages." (see Hale (1983)); including the fact that in the end, it proves to be not so "non-configurational" after all. The ASL sentence is built around a "verb complex" which contains clitics, agreement morphemes, and an incorporated nominal designating the Theme (Gruber 1976; Jackendoff 1972), as well as various aspectual inflections. The verb complex is sentential in character, so that the ASL sentence often consists of nothing but the verb complex. Outside NPs are often signed once per discourse
and are not necessarily repeated as full pronouns thereafter.

Our major concern in this chapter will go beyond the lexicon as we will be concerned with a part of the ASL anaphora system. It should be particularly interesting to see what this semantically perspicuous language does in this area. Here we are dealing with relationships of co-indexing and binding that are inherently logical (having to do with identity and scope) and ostensibly have nothing to do with location and space. Our focus will be on the role of the LOC1 marker in the sentence and in discourse utterances. In particular, we will distinguish between the properties of the LOC1 marker which appears attached to the verb (the LOC1 marker involved in theta-role marking) and the LOC1 marker that appears as part of the classifier and role prominence clitics (the LOC1 marker involved in case assignment). Along the way, this will bring us into issues related to the pro-drop parameter and the zero-topic parameter because it is the way which ASL functions with respect to these two parameters which will help us tease out the role of the locative argument markers vs. the clitics.

We will begin with the overly simple assumption that the ASL verb complex is represented at LF as an open proposition whose free variables are ultimately bound by quantifiers which bind variables across an entire discourse segment. This is in fact the representation that the phonetic form of the verb complex at first suggests. Later, we will refine this claim somewhat, arguing in fact that the variables may need to be locally bound. But our initial suggestion reflects the fact that ASL is a discourse
dependant language which tends to seriate clauses, allowing them to contract relations, not syntactically by markers of subordination, but at the discourse level. We will explicate this claim below.

Let us consider, again, our simple example, with special focus on the anaphora system: "Sue hit Mary." Although there are several ways to sign this sentence, for now we will consider only one. Somewhere in the discourse preceding this sentence, Sue and Mary will have been introduced. The way in which they are introduced is characteristic of ASL. Sue and Mary are each associated with or assigned to a particular location in the signing space in front of the signer. These locations will each serve thereafter, for the rest of the discourse segment, to designate Sue and Mary respectively. If Sue has been assigned a particular location to the right of the signer, any pointing to or orienting toward this location designates movement to or from Sue (without having to repeat her name). The association of a nominal with a particular location is done in an identificational clause which means something like: "As for Sue, I direct your attention to location 51 (i.e., Sue is associated with location 51)," where the locations in the signing space are arbitrarily assigned numbers. Mary is established in a similar manner. These clause-like units are physically realized in the following manner: the noun is signed (i.e. the name sign or fingerspelled sign for Sue) and then the signer points to an arbitrary location in the signing space (say LOC 51) that will thereafter stand for or designate the referent of the noun (e.g. Sue). This type of pointing is a fully grammaticalized process in ASL (see Hoffmeister (1978), Kegl
(1976a)), not by any means an extra-linguistic process. In fact, the pointing index finger is in reality a classifier for long thin objects (here a line to the location), used in a good variety of signs, for a great many sorts of long thin objects. The particular variant of the long thin object classifier (index finger in a horizontal orientation) used here, to associate Sue with a particular location, is actually nearly stripped of semantic content. This classifier is the most unmarked one in the language and shows up not only classifying objects which are physically long and thin, but also in cases where its meaning is largely left undetermined and unspecified (see McDonald (1980). This undetermined and unspecified form of the long thin object classifier will be referred to as a "deictic marker" (DM) -- it is used to indicate objects and locations, as well as to trace paths. Sue and Mary, once introduced into the discourse, will not be repeated each time we want to say something about them. If several sentences later, say, we want to mention Sue and Mary, we do not re-sign their names, rather, they will be represented by pronouns, clitics and agreement markers that co-refer back to them through the locations that they have been assigned to. The verb complex itself consists of at most two matrix clitics (one role prominence clitic and possibly one classifier clitic) and a verb consisting of at most two LOCs, two movements, two terminators and an associated theme (either a simple classifier or a clausal theme).

There are several important points to be made about the verb complex. The first concerns certain interesting properties of clitics and themes. in fact clitics. But, perhaps most
importantly, we need to examine the role of LOC1 in the ASL sentence and discourse and the insights it gives us into every level of linguistic structure (D-structure, S-structure, LF, LF' and even PF). This final discussion will lead us into a more detailed discussion of ASL in the GB framework where we will focus upon two parameters (the pro-drop parameter and the zero topic parameter, the nature of empty categories and representation at LF and LF').

6.1 CLITICS AND THEMES

Clitics and themes share in common the fact that they play a central role in the interface between the lexicon and the syntax, and thus pose some interesting problems. They both interact with processes of incorporation which relate syntactic argument positions with positions internal to a word. Furthermore, they both raise certain modality specific questions with respect to their phonetic representation. Clitics, for example, are unstressed words which attach to an adjacent lexical item. In traditional accounts of incorporation, the incorporated element, a nominal \( (N^c) \), is affixed to the verb--a process of merger which creates a single lexical item \( (V^c) \). It has been likened to processes of cliticization in Romance [2], or classifier cliticization in Bantu (see Baker (1983)). Generally, noun incorporation is considered to apply to syntactic direct objects, irrespective of their thematic role. ASL, on the other hand, exhibits two separate phenomena: "classifier cliticization," which involves only non-themes; and a second process, "nominal
incorporation, which applies solely to syntactic themes. For the purposes of the above discussion, we will consider the role prominence clitics to be a sub-variety of the classifier clitics.

Lexical themes, as we discussed in Chapter 3, have the unique property of being realized concurrent with the motion of the verb. They hold no linear precedence relation with respect to the verb. We will not again concern ourselves with this property here, but will mention an additional set of data, such as the instances of noun incorporation given in Chapter 5, involving the incorporation of a syntactic argument, which holds the relation theme to the verb, into a position directly prior to the articulation of the movement portion of the verb. There is an anti-causative form of the GIVE-verb in these sentences which is represented by the absence of the handling classifier. In such instances, the syntactic theme incorporated into the verb appears not only directly prior to the movement, but also perseverates through the movement of the verb. Thus, the syntactic theme literally shows up in the lexical theme slot. The only difference is that this incorporated nominal is accessible to syntactic co-indexing processes in a way that true lexical themes are not. The two

2. The similarity between ASL clitics and the Romance-type clitics is readily apparent. What's not so clear is whether this similarity is just a typological co-incidence or whether it stems from a historical tie between French and ASL. ASL is a creole of Old French Sign Language and an indigenous sign language. If the interaction between ASL and spoken English is any indication, the language contact situation between spoken French and Old French sign language could very well have affected the syntax of Old French Sign Language. This is not to say that the two languages were one in the same, but simply that they influenced each other as we would expect any two languages in contact to do.
sentences below illustrate the typical GIVE sentence and the anti-causative form:

1. 'Sue gave Mary a book' (causative version; with handling CL)

   Sue 30 role prom. BOOK a handling moves Mary 70
   person at [3] from location 30 to location 70

2. 'Sue gave Mary a book' (anti-causative version; handling CL omitted)

   Sue 30 role prom. BOOK a handling moves Mary 70
   person at [3] from location 30 to location 70

   'A book went from Mary to Sue.'

The incorporated nominal in all these examples must be an X, although the remains of a NP can be left in the syntactic argument position with the trace of the incorporated element. Furthermore, it is also possible to have a copy of the incorporated element remain in the syntactic argument position, but only when the remaining NP gives more specific information than the incorporated element. Otherwise, the syntactic N is omitted. The conditions on the presence or non-presence of the syntactic copy are discussed in Kegl (1976).
6.1.1 Distinguishing Clitics From And Overt Pronouns And Anaphors

Overt pronouns (pronominals and anaphors) and case marking clitics (classifier clitics and role prominence clitics) are both typically unstressed and are both typically cliticized to other lexical items. Yet they still have rather different properties. For example, clitics are always realized at PF. They are generally moved to the beginning of a lexical item, most typically a verb, but they are never deleted. Pronouns, on the contrary, are always deleted unless they somehow receive stress; either as the result of cliticization to a preceding NP, as the result of contraction with a verb, or as the result of emphatic marking which stresses an unstressed pronoun. (Possessive pronouns which agree with the possessor, not the possessed item, never delete. We will not discuss the possessive pronouns here.) Whereas clitics are invariably word initial, cliticized pronouns (contraction forms) can be word initial or word final. If contracted pronouns are word initial, they don't end up in a stressed position and therefore are not overtly realized at PF. (See Kegl and Philip (in preparation).) Pronouns, although dialectally they vary in their position before or after NP, do not seem to be involved in any movement rules. Pronouns indicate definiteness, whereas clitics, unless heavily marked as topics have no such interpretation. Finally, clitics involve classifiers or the signer's body position functioning as a theme associated with a locative form (AT LOC); whereas pronouns involve classifiers associated with a motional form (TO LOC).
Pronouns are either pronominals or anaphors, and as such they are indistinguishable from their spoken language counterparts in terms of their characteristic properties. This similarity alone makes them rather remarkable in terms of the grammar of ASL. Given that thematic relations and co-indexing between syntactic NPs and clitics, discourse NPs and clitics, and NPs and LOCs are directly observable in the sign stream; it is interesting to note that a distinction between pronominals and anaphors is still, to a certain extent, relegated to the abstract knowledge that must be learned by the signer—not the fact that such a distinction exists, but which lexical items constitute anaphors and behave as such with respect to binding theory, and which lexical items constitute pronominals and behave as such. Such information cannot be directly "read off" of the visible co-indexing relations available at PF.

Actually, the disjoint reference of pronominals within a governing category can be directly observed at PF. The pronominals will always be associated with two different points points in the signing space. [3]

Likewise, an anaphor will always have the same spatial index as its antecedent. But, the indexing possibilities with respect to anaphors runs into an interesting conflict when we compare the co-indexing possibilities of the anaphor and antecedent with their

3. I am simplifying things a bit. Actually, it is not always the case that disjoint reference is marked by the use of different points in space. Sometimes, they are distinguished by other markings: a change in facial expression, a change in tension of the hands, body posture, hand dominance, etc.. These are a bit more limited in their range of possible distinctions, but all are equivalent in function to the spatially marked distinctions.
corresponding co-referent LOCs in the theta-marking component. In any given complex verb, within a domain where one LOC co-commands another, the source LOC and the goal LOC must have distinct indices. Thus, with respect to theta-theory, all source and goal LOCs must be disjoint in reference. Yet, there are sentences like "John hit himself" where John is understood as co-referent with both the source and the goal by virtue of Principle A of the Binding Theory, even though the Thematic Coherence Principle prohibits the co-indexing of the source and goal. Thus, we see that in ASL the case-marking and theta-marking systems must be modular (totally independent of one another). The chains which are defined with respect to case relations and those defined with respect to theta-relations must be distinct entities. The presence of an anaphor in the sentence serves to set the two visibly distinct indices on the locative arguments of the verb equal to one another, for the purposes of Binding Theory. Yet, they remain distinct with respect to Theta-Theory. The binding relation cannot depend upon the physical realization of the sign in space for interpretation, since the two LOCs will appear to have distinct indices. Only knowledge that the pronoun in question is an anaphor, in conjunction with Principle A, will resolve the conflict, yielding the proper interpretation.

This leads us to see that "semantic perspicuity," in ASL is not all pervasive. Yes, it plays an extensive role in the grammar, but never does it supersede the abstract principles assumed to be available in UG (universal grammar). Earlier, we saw that the directly observable relations between MOVEs and LOCs can give us an
insight into the marking of sources vs. goals. But, in addition, we found that what may have seemed to have been a phenomenon describable totally on the basis of semantic perspicuity, was independently analyzed as a purely structural relation between heads and their complements. In fact, when we get to the clitics we find that although "sources" precede "goals." The source and goal clitics are found in the same position, preceding the verb. Structural position, in this case overrides "perspicuity."

In all fairness to the "semantic perspicuity" claim, we could get out of this by saying that ASL is actually "hyper-perspicuous" in this instance. In spoken languages, figure tends to precede ground. Yet, in another sense (the topic-comment system, non-linguistics situations like the opening descriptions of plays, narrative introductions, etc.), it is preferable to introduce the ground before introducing the figure. ASL, we can say, resolves this conceptual/perceptual conflict by introducing the ground first (in the form of a classifier clitic signed by the non-dominant hand) and the figure second (in the form of the theme). Yet, since the two articulators are distinct, the ground can be signed initially but being inherently non-moving, the ground articulator can be left in position to perseverate throughout the signing of the following sign. It is present before, during and after the articulation of the theme. Thus, the ground is present as background and remains as a relevant backdrop throughout the articulation of the sign to which it is cliticized. The freedom from forced linear precedence in this case allows ASL to resolve the figure-ground paradox.
Having strayed sufficiently, let's return to our discussion of pronominals and anaphors. The ambiguity generally tied to utterances where a pronominal must be free does not arise in ASL. Since the indices are overt, we can see that both possibilities (actually an infinite number of possible co-indexings and disjoint indexings) can exist, but their realizations are phonetically distinct.

The pronominals in ASL are the deictic pronouns usually involving the g-classifier, but also sometimes the b-classifier (when indicating honor or formality) and the A-classifier (indicating intimacy). They are unspecified for gender distinctions and mark the ASL equivalents of he, she, it, they (distributed and exhaustive), etc. The only anaphor is the reflexive pronoun SELF which involves an A-classifier. This form is nearly homophonous with the intimacy marker mentioned above, but is far more frequent. Furthermore, for some signers it is phonetically distinct in the sense that although the shape is the same (fist with thumb extended), the orientation of the pronominal intimacy marker (A-classifier) is specified for thumb tip orientation; whereas the reflexive (A-classifier) is specified for orientation of the knuckles. Even without this distinction the two type pronominal and anaphor are easily distinguished.

There is no reciprocal pronoun. This may be because the reciprocal form in spoken languages is signally a simultaneous relation not easily captured in a strictly temporally sequenced modality (at the word level, not the speech level). Reciprocals are marked by reciprocal agreement on the verb. This agreement
involves the simultaneous realization of two individual verbs. For example, "person 1 and person 2 hit each other" would be marked by the simultaneous articulation of "person 1 hit person 2" and "person 2 hit person 1." A sequenced variant is also possible.

Pronouns and clitics differ not only in function, but in form. Below are representative pronoun forms. Notice that the clitics are classifiers and the role prominence marker embedded within a locational string (AT LOC) and pronouns are classifiers embedded within a motional string (TO LOC). The \([e]\) represents the absence of an NP "argument" within the indexing phrase. We assume the presence of such a structure by analogy with the identificational phrase and on the basis of the seemingly "verbal" (case assigning) characteristics of the matrix string (such phrases can stand alone as independent clauses and they are inherently motional in form--where motion is inherently more verb-like (action) and location more noun-like (stasis).

**PRONOUNS:**

\[
\begin{array}{c|c}
\text{Pronominal} & \text{Anaphor} \\
\hline
\text{[e] TO LOC} & \text{[e] TO LOC} \\
\text{WARD LOC} & \text{A-classifier} \\
g-classifier & \\
b-classifier & \\
A-classifier & \\
\end{array}
\]

Figure 1.

A independent stressed pronominal is only slightly different. It is stressed, the marker for emphasis.

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STRESSED PRONOMINAL FORM:

/ [e] TO-LOC [+emphatic] g-classifier

Figure 2.

The possessive NP and pronoun are included simply to show the same pronoun/NP relation between the two forms:

POSSESSIVE FORMS:

Possessive+NP

-------------
NP TO LOCi
WARD LOC
b-classifier

Possessive Pronoun

-------------
[e] TO LOCi
WARD LOC
b-classifier

Figure 3.

Next we have a set of representative clitic forms: a classifier clitic and a role prominence clitic. Notice that they are structurally identical and static in nature:

CLITICS:

--------
Classifier Clitic

-------------
AT LOCi
classifier (CL)

Role Prominence Clitic

-------------
AT LOCi
signer's body (SBP)

Figure 4.

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6.1.2 Distinguishing Clitics From Inflectional Affixes

Next we need to distinguish clitics from inflectional affixes: elements morphologically bound to the verb. Here we are distinguishing the classifier clitics and the role prominence clitic from locative agreement markers, both in form and in function. The form distinction is easy. A clitic is a configuration consisting of a classifier or the signer's body serving as the theme of a locative relational string (AT LOCi). A locative argument marker, on the other hand, is just a location and its index (LOCi), nothing more. In fact, a clitic has a locative argument marker as part of its make up.

Now we turn to the harder task of distinguishing clitics from inflectional affixes. First, clitics can be free standing under stress, whereas LOCs are bound affixes. They never receive stress and they never stand alone. Clitics (true grammatical, not just phonological clitics) can be involved in movement rules. The clitics in ASL give evidence of having moved at PF. The evidence mentioned in earlier chapters will be summarized here. They climb across verbs like WANT. They climb out of embedded themes. They climb out of positions internal to compounds. Furthermore, they are inherently unstressed and therefore we find them attached to another lexical item, the verb, in order to be realized.

Of course the biggest distinction between clitics, inflectional affixes (LOCs) and pronouns is the fact that clitics behave as case markers. They function as AGR in the strong sense. LOCs are tied to the thematic system and play no role in
case-marking. Pronouns are arguments. Their interpretation is based upon position in the sentence and their presence or non-presentation is conditioned by the presence or absence of AGR, namely, the clitics. This will be the focus of the remainder of this chapter. We will begin with a discussion of the component which all co-indexed entities share: the LOCi Marker.

6.1.3 The LOCi Marker

The ASL utterance can be seen as onionlike or layered with the verb and its LOCi markers as the core, surrounded by the clitics, in turn surrounded by the syntactic argument positions (A-Positions), and finally by discourse antecedents (which we will later argue are co-indexed with empty A'-Positions—zero topics). A common element at each of these layers is the LOCi marker. The co-indexing possibilities between these LOCi markers reveals a great deal about the nature of linguistic relations in ASL. On a more speculative note, the properties of these LOCi markers may very well aid us in characterizing the nature of linguistic relations in general. ASL is unique in the sense that in many instances co-indexing is overtly manifested at PF. In the same way that we used semantic perspicuity in ASL to constrain theories of Thematic Relations, we may also be able to use these overt indices to constrain and distinguish possible types of linguistic relations.
In order to illustrate the various positions of the sentence in which \textsc{loci} occurs, we will include below representations of the D-Structure, S-Structure and PF for the simple sentence "Sue hit Mary." In order to avoid added complications, we have chosen a sentence with full NPs in its argument positions. Such a sentence is not dependent upon discourse antecedents. Furthermore, the sentence contains the maximum number of sentence internal layers containing \textsc{loci} markers: the verb, the clitics, and the syntactic arguments.

3. 'Mary hit John' (D-Structure)

At D-Structure, we represent the sentence as above with no indices on the LOC argument markers. The assignment of indices can be done freely at S-Structure. The indexing possibilities are constrained by independent modules of the grammar. The position of the classifier clitic is open to question. It could either be generated in place--already incorporated into the verb; or it can be assumed to originate in a syntactic argument position governed by the verb. Notice that ASL exhibits clitic doubling. The nature
of the remaining NP is of interest. As we will see, either
analysis of clitic position leaves us with the observation that the
classifier clitic, either by virtue of its adjacency or by virtue
of its morphological attachment to the verb, absorbs accusative
case; thus, forcing the NP in object position to be fronted to an
A'-position. As a result, we get the effect that NPs in ASL can
function as quasi-quantifiers binding the real arguments, the
clitics. However, as we will see later, this is not the whole
story because only a subset of the transitive verbs (HIT-type
verbs) have classifier clitics associated with them. In the
non-clitic forms (LIKE-type verbs), the NP is adjacent to the verb.
It does receive case. And, therefore, it need not move out of its
argument to a topic position. For a discussion of adjacency and
case assignment see Travis (1984). For a discussion of syntactic
affixes which can absorb case see Fabb (1984).

4. 'Sue hit Mary' (S-Structure)  
-------------------------------- [4]  

```
S
 / 
INFL
 / 
INFL
 / 
AGR
 / 
V
 / 
N
 / 
N
 / 
N
 / 
N
 / 
N
|   |   |   |   |
SUE  TO-LOC1  AT-LOCj  AT-LOC1  LOC1-FROM TO-ON-LOCj  t  MARY  TO-LOCj
|   |   |       |       |     |   |
g-classifier  g-class.  r.p.clitic  s-classifier  |  g-classifier
```
The internal structure of the verb, [LOC-FROM#TO+ON-LOC] is purely lexically determined. It is possible that the clitics are generated in verb initial position in the lexicon as well. However, we will assume a movement analysis where the object clitic moves to AGR becoming a sister of the subject clitic and then at PF these two elements cliticize to the verb. Notice the ordering of the clitics in the example above. I spent a great deal of time attempting to determine the ordering of the classifier clitic relative to the role prominence clitic. Generally, when certain orderings, for example the ordering of the classifier clitic with respect to the verb, are obscured by various phonetic processes; it is possible to discover the actual ordering by a variety of tests. The first involved deliberate sequencing. If one presents the classifier clitic and verb in the following three ordering relations the (a) and (b) orderings will be acceptable, but the (c) ordering will not:

4. To be able to focus on the simple example we will represent the S-structure and PF-structure representations without reflecting the rule of NP fronting which moves the object NP to an A'-position when a classifier clitic is present. This process should be mentioned, however, because it seems to indicate that this object NP is in an argument position as opposed to an A'-position. If the verb HIT were the form mentioned in Chapter 5 where the HIT portion appears in the theme position of a WARD LOC string, then its clitic would not trigger NP-fronting and the form above would be the expected representation.
POSSIBLE ORDERINGS OF CLASSIFIER CLITIC AND VERB:
--------------------------------------------------

a. CL - V     b. V       c. * V - CL
\[\]
  CL

Figure 5.

Although second language signers frequently confuse the
orderings of clitic and verb, children acquiring ASL as a
native language don't seem to produce the incorrectly ordered
forms (Supalla (1982)). Finally, in formal signing and
emphatic signing (unraveled forms) the classifier clitic always
appears first.

All these tests work in determining the ordering of the
role prominence clitic with respect to the verb as well.
However, they are inconclusive when used to determine the
relative ordering of the clitics with respect to one another.
If frequency of ordering has any relevance, then the ordering
would be the least expect order: classifier clitic, role
prominence clitic. But the simultaneous realization runs a
close second and the reverse order is not far behind. The
representation above reflects the analysis one might propose to
account for the most frequent ordering. This analysis assumes
the clitics to be generated in argument positions adjacent to
the verb. The role prominence marker is generated in INFL and
the classifier clitic in object position. When the the clitic
moves to become a left sister of the role prominence clitic,
and then at PF the entire configuration in INFL cliticizes to
the verb.
This is a needlessly complicated story. There appears to be a far more natural and simple solution; one that not only accounts for the facts, but actually gives us some insight into linguistic relations. [5] The solution concerns the nature of linear precedence relations and the independence of precedence and dominance. If ordering relations are stated on the basis of individual constituents, then it should be possible to have partial ordering statements. Certain elements are ordered with respect to other elements, but the ordering statements need not be exhaustive. For example, we can have the following ordering statements with respect to A, B and C: 1) A preceded B, 2) C precedes B. No ordering is stated for A relative to C. In this instance we would expect the relative ordering of A and C to be free, provided both precede B. They can be ordered: A before C, C before A, A and C simultaneous, or any variant of A and C overlapping. The latter two orderings are actually predicted by a theory which allows partial ordering, but given the nature of the vocal apparatus such orderings seem highly disfavored if not impossible. In ASL, they are easy to articulate and thus we see how the ordering (or shall we say lack of ordering) relation exhibited by the clitics in ASL is perfectly natural; in fact, it fills in a gap predicted by partial ordering theories developed on the basis of spoken language data (particularly data on non-configurational languages). Thus, the linear precedence relation inside the ASL verb complex is as follows: clitic precedes verb.

5. I have Jim Higginbotham to thank for bringing this solution to my attention. See also his work related to dominance and linear precedence: Higginbotham (1983a,b).
Compare the cliticized NP-pronoun forms in the PF-Representation below with the free standing pronouns, mentioned earlier, which delete when unstressed. Presumably, the deletion occurs in those cases because there is no lexical material available to which the pronoun can attach. As can be seen below, PF differs from the S-Structure representation above only in the sense that the determiners are cliticized to their adjacent NPs and the clitics in INFL are cliticized to the verb.

5. 'Sue hit Mary' (PF-Structure)

The situations in which pronouns delete might give us an argument that there is a trace in the position adjacent to the verb and between the verb and the object NP; and between the verb and the subject NP. The argument goes as follows: Assume that cliticization only occurs when there is lexical material available to which the pronoun can attach. Second, assume that
stressless pronouns can cliticize, but they are incapable of movement in the sense of move-alpha. Thus, they cannot move to word initial position in the way clitics can. They either attach, or they are stuck and cannot be realized. Now consider a verb such as LIKE. This verb is transitive, but it does not have an associated classifier clitic. This verb requires either the presence of a free standing stressed pronoun in object position, or a cliticized pronoun at the end of the verb. Now consider the verb HIT. HIT does occur with a classifier clitic. This verb does not require the presence of a pronoun in object position and it doesn’t allow cliticization of a pronoun to the end of the verb. It does, however, allow a stressed pronoun in object position. These facts can be accounted for with the simple observation that a clitic associated with the verb binds a trace in object position. When this clitic is absent, no trace is present. The trace, although not visible, blocks cliticization of an object NP to the verb. In the LIKE example where no trace is present nothing blocks cliticization and thus we find that pronouns frequently cliticize to the end of such verbs. There is always a role prominence clitic in INFL. Such a clitic attached to the verb at PF (or is generated in place with a corresponding trace in INFL. In any case, there is always a trace in between the subject pronoun and the verb, there for we would never expect cliticization in this position. Thus, we find phonetic evidence of the existence of this empty category in ASL.
6.2 TYPOLOGICAL PARAMETERS AND EMPTY CATEGORIES

We mentioned earlier that although the LOCi "agreement markers" play a crucial role in the assignment of theta roles to the nominals co-indexed with them, they do not play a crucial role with respect to Case Theory. They do not function as AGR in the sense of Government and Binding Theory. The elements central to Case Theory appear to be the subject (or role prominence) clitic and the object (or non-theme) clitic which were discussed earlier.

The rule of pro-drop plays a central role in distinguishing between the behavior of the LOCi "agreement markers" on the main verb and the clitics which behave as AGR. These clitics, by the way, are also potentially clausal and include LOCi markers themselves). For example, the "agreement marker" LOCs on the verb do not condition pro-drop, whereas the clitics do. The subject/role prominence clitic need not be coindexed with one of the LOCs on the verb, yet when subject pro-drop occurs, it is the discourse NP co-indexed with this clitic which is taken to be the subject. In the case where a discourse antecedent is lacking, the empty category in subject position is interpreted as having all those features associated with the role prominence clitic and is assumed to be the unmarked NP generally associated with that clitic (in the case of the subject/role prominence clitic: "some role prominent person.")
Let us look at three examples which will help us illustrate the various points made above concerning clitics vs. LOCs. We now add to our representation certain information concerning the presence or absence of full noun phrases, either in the preceding discourse or in the sentence itself. The use of ellipsis ("...") will indicate that the preceding material is present or not present in the preceding discourse, but is not part of the sentence. There is no limit on the amount of material intervening between these discourse referents and the sentence, except for the stipulation that no intervening NPs be assigned the same index. In the sentence below there are no NPs present in the discourse which are co-indexed with LOC20 or LOC10. Also, again we will give the examples without the output of the Fronting rule.

6. 'Some person with role prominence hit some other person.'

<table>
<thead>
<tr>
<th>g-classifier</th>
<th>r.p.clitic</th>
<th>s-classifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>long thin person with a round solid object</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I have included examples like the one above (i.e. sentences with empty argument positions which lack discourse antecedents) because it is sentences of this type which allow us to distinguish between pro-drop cases vs. zero topics in ASL. We will argue that pro-drop cases like as in the example above above allow empty categories in argument positions when discourse antecedents are
lacking. As will be shown later with verbs such as LIKE, which do not allow pro-drop, empty categories can remain in argument positions only when there exist discourse antecedents. The equivalent of the above sentence with the verb LIKE is ungrammatical. The next sentence is identical with its predecessor except for the fact that there are NPs present in the discourse which are associated with LOC20 and LOC10. The ordering in which these outside NPs occur is irrelevant.

7. 'Sue (with role prominence) hit Mary'

\begin{center}
\begin{tabular}{c}
\begin{tabular}{llllll}
\hline
Sue & TO-LOC & ... & Mary & TO-LOC & ...\end{tabular} \\
\begin{tabular}{llllll}
\hline
g-classifier & g-classifier & g-classifier & r.p. clitic & s-classifier \end{tabular} \\
\hline
20 & 10 & 10 & 20 & 20 & 10 \\
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{l}
\begin{tabular}{|l|l|l|l|l|}
\hline
identificational phrases & obj. clitic & r.p. clitic & verb \\
\hline
Sue20... Mary10... & long thin & person with & a round solid object & moves from LOC20 to \\
(in preceding discourse) (person) & at LOC20 & role prom. & being in contact with & at LOC10 LOC10 \\
\end{tabular} \\
\end{tabular}
\end{center}

The following sentence is identical with the one above except that the full NPs are present in the sentence, rather than previously introduced in the discourse.
8. 'Sue (with role prominence) hit Mary.'

The three sentences above are all perfectly grammatical ASL utterances. These three examples bring to light two important typological characteristics of ASL. First, ASL is a discourse-oriented rather than a sentence oriented language; and, second, it is a pro-drop language. Let us first address the less familiar of these two characteristics—the property of being discourse-oriented rather than sentence oriented.

Tsao (1977) argues for a typological parameter, "discourse oriented" which exhibits a set of properties which "sentence-oriented" languages do not. According to Tsao, among these properties is a rule of "Topic NP Deletion," which operates across discourse to delete the topic of a sentence under identity with a Topic in a preceding sentence. The result is a topic chain which we illustrate below with an example from Chinese (Huang (1984:549)):
9. [Zhangguo, difang hen da.] [[e], renkou hen duo.]
   China place very big population very many
[[e], tudui hen feiwo. ] [[e], gihou ye hen hao.]
   land very fertile climate too very good
[[e], women dou hen xihuan.]
   we all very like

'(As for) China, its land is very large. (Its) population is very big. (Its) land is very fertile. (Its) climate is also very good. We all like (it).'

Huang (1984) adapts Tsaö's notion of "Topic NP Deletion" to an interpretive framework by assuming there to be a rule of co-indexation in the discourse grammar of discourse-oriented languages (i.e. in the LF' module following LF), which co-indexes an empty topic node with an appropriate preceding topic. Huang terms this empty topic a "zero topic" and languages which allow such zero topics "zero topic languages" (see Huang (1984)). Among the class of zero topic languages are Chinese, Japanese, Portuguese, German and ASL. Sentence-oriented languages do not allow zero topics.

A discourse based approach works well for ASL, but it doesn't tell the whole story. The second sentence of the set involves zero-topics, but a discourse based approach assuming zero topics cannot account for the grammaticality of the first sentence which has empty categories in its argument positions but no available topics in the preceding discourse. Based on our discussion thus far, such sentences should be bad. In fact, in Chinese, such a sentence would be bad. Chinese does not allow zero objects unless they are variables. Variables must be bound by an operator (i.e.,
the topic). Furthermore, the topic must be an overt NP or must be coindexed with one at LF. If the empty topic cannot be coindexed with some preceding NP in the discourse (presumably because no such candidate exists), the sentence is bad.

The acceptability of the first sentence in ASL is not linked with the fact that it is discourse-oriented, but to another typological parameter: The Pro-Drop Parameter (Perlmutter 1971, Borer 1983, Chomsky 1981, Chomsky and Lasnik 1977, Jaeggli 1982, Taraldsen (1978), Huang (1984)). There is an observation which has been attributed to Taraldsen (1978) and which we will, following Huang, hereafter refer to as the "Taraldsen Generalization." Basically, the Taraldsen Generalization suggests that the possibility of pro-drop in a language often correlates with the existence in that language of a rich inflectional morphology, in particular, a rich system of agreement. Chomsky (1981, 1982) suggested the following:

To begin with, let us assume—following Taraldsen (1978b)—that the parameter involves the inflectional element INFL, or more precisely, the agreement element AGR (=PRO) that is the crucial component of INFL with respect to government and binding. The intuitive idea is that where there is overt agreement, the subject can be dropped, since the deletion is recoverable.

Chomsky goes on to suggest that in Italian-type languages, with a rich inflectional system, the element AGR permits subject-drop while in French-type languages, it does not. Furthermore, and most interesting for our purposes, a language might have a mixed system which permits subject pro-drop in some constructions but not in
others. Irish (Taraldsen (1978), McCloskey and Hale (1982)) and Hebrew (Chomsky (1981)) have been proposed as languages with such a mixed system. In Irish, for example, a verb, preposition or head noun may or may not be inflected for the person and number of the subject, the prepositional object, or the possessive, respectively. When the form is inflected, pro-drop is prohibited. McCloskey and Hale suggest the possibility that the markings are clitics, or incorporated pronouns, rather than AGR. The Irish case is relevant to our interests since here also it is the clitics (both subject and object) which seem to condition pro-drop. Similarly, when the verb is inflected (takes a clitic), pro-drop is obligatory—unless the pronouns are marked [+emphatic]. Verbs in ASL also vary as to whether they take both subject and object clitics. All verbs obligatorily have a role prominence marker which appears to function as a subject clitic. However, verbs like "HIT" vs. "LIKE" can be distinguished on the basis of whether or not they take an object clitic. It is this distinction which allows us to tease out the effects of zero topics from the effects of pro-drop.

The verb HIT, which was involved in the sentences above, takes an object clitic. The verb LIKE, on the other hand, does not. Let us consider three sentences using LIKE which parallel the HIT examples. The verb LIKE in ASL has the following morphological form:
10. LIKE:

\[
\begin{align*}
\text{WARD LOC} & \quad \text{(To orient toward something, while handling a long thin object associated with the chest (an emotion))} \\
\text{LOC} & \quad \text{ON+FROM} \\
\text{chest} & \quad \text{TO+ON LOC} \\
g\text{-classifier opposed} & \quad \text{[6]} \\
\text{(emotion)}
\end{align*}
\]

The first LIKE sentence below parallels the first HIT sentence in the sense that its argument positions contain empty categories, and there are no possible NP antecedents in the discourse. The only difference is the lack of an object clitic and the fact that the sentence is ungrammatical.

11. 'Some person with role prominence likes ___'

\[
\begin{align*}
\text{[e] subject-clitic likes [e]} \\
\text{"Some person with role prominence likes ___."}
\end{align*}
\]

Sentences like the next two below parallel the second and third HIT

6. The notation "g-classifier opposed" is actually a simplification of the representation for this form which is actually the reciprocal form of a contacting relation between the abstract g-classifier for emotion (middle finger) and the thumb, where these two classifiers simultaneously serve as an embedded object/non-theme clitic and theme. See Chapter 3.
sentences. The first contains two empty categories co-indexed with discourse NPs, whereas the one after it has these same NPs within the sentence. Both sentences are grammatical.

12. 'As for Mary, as for Sue, she likes her'

\[ \text{MARY TO-LOC \ldots SUE TO-LOC \ldots AT-LJC \# WARD LOC} \]
\[ \text{g-classifier \ldots g-class. \ R.P.Marker \ LOC \ ON+FROM} \]
\[ \text{chest TO+ON LOC} \]
\[ \text{g-classifier opposed \ (emotion)} \]
\[ \text{Mary} \quad \text{Sue} \quad [e] \quad \text{person w/ role prom. likes at LOC} \]
\[ 10 \quad 20 \quad \text{10} \quad \text{loc20} \]

13. 'Sue likes Mary'

\[ \text{SUE TO-LOC AT-LJC \# WARD LOC} \quad \text{MARY TO-LOC} \]
\[ \text{g-classifier R.P.Marker LOC ON+FROM} \quad \text{g-classifier} \]
\[ \text{chest TO+ON LOC} \]
\[ \text{g-classifier opposed \ (emotion)} \]
\[ \text{Sue} \quad [e] \quad \text{person w/ role prom. likes Mary at LOC} \]
\[ 20 \quad \text{10} \quad \text{20} \quad \text{10} \]

The difference in acceptability between the HIT sentence with no discourse and its counterpart with LIKE allows us to distinguish between the effects of zero-topic and pro-drop in ASL. Zero topics cannot account for the grammaticality of a sentence which has no discourse antecedents. Only pro-drop could account for the
grammaticality of this HIT example. Interesting corroboration comes when we examine the meaning of the first LIKE sentence when there is a single discourse antecedent, namely, the NP co-indexed with the object.

14. 'Some person (with role prominence) likes Mary.'

---------------

MARY TO-LOC ...Ø...AT-LOC # \n| \n| \n| \n| \n| \n| \n| g-classifier R.P.Marker LOC ON+FROM

\n\n\n\n\n\n\n\n
Mary

[e] person w/ likes [e]

role prom. at

location 0

Since every ASL sentence obligatorily has a subject clitic, pro-drop will always be possible for subjects. Any of these sentences without the role prominence clitic would be ungrammatical.

15. 'Sue likes Mary (no role prominence clitic).'</n

---------------

* SUE TO-LOC # WARD LOC \n| \n| \n| \n| \n| \n| \n| \n| g-classifier LOC ON+FROM g-classifier

\n\n\n\n\n\n\n\n
Sue role prom. likes Mary

20 clitic is missing 10

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Clearly, the clitics behave like AGR allowing the deletion of arguments with which they co-occur. The representation in the Figure below is indicative of the configurational structure of a sentence containing a verb like HIT which co-occurs with both a subject and object clitic.

**CONFIGURATIONAL STRUCTURE OF S WITH BOTH SUBJECT AND OBJECT CLITICS:**

![Diagram of sentence structure with clitics]

*Figure 6.*

Basically, it is the clitics in ASL which function as AGR, and AGR is strong enough to condition pro-drop. Pro-drop can be directly correlated with the presence or absence of a clitic. One possible explanation is that the clitic being somewhere between an agreement marker and a noun can be assigned case. In ASL, the clitics actually function as the true arguments. NPs are actually in A'-positions which co-command and bind these clitics, but being non-arguments cannot be assigned case. Therefore, an empty
category in such a position will be [-case] and therefore not subject to the Case Trace Filter stated below:

\[
\text{CASE TRACE FILTER}
\]

\[
\begin{array}{c}
\text{#[e]} \\
\text{[-case]}
\end{array}
\]

May (1983:239)

NPs in A-positions get case. Therefore, an empty category in such a position (i.e., in the object position of a verb such as LIKE which does not take an object clitic) will get case and will therefore be ruled out by the Case Trace Filter. Since ASL allows topics which can bind empty categories converting them to variables, violations of the Case Trace Filter will only occur in examples like the first LIKE sentence which are without object clitics and which have no discourse antecedent. This again is evidence of the need for adjacency in case assignment in ASL. An allos of the presence of the clitic in the HIT but not the LIKE examples.

We now can see that all but the initial HIT-type sentences are good for two reasons. They allow pro-drop and they allow zero topics. The initial HIT sentence is only good because it allows pro-drop. Furthermore, the first LIKE sentence is bad because there is no object clitic to allow pro-drop and there is no discourse antecedent to \(\text{\textcopyright-index}\) a zero topic. The second and third LIKE sentences are good because zero topics bind the empty categories making them variables and there are discourse antecedents to \(\text{\textcopyright-index}\) these zero topics.
6.3 CONCLUSION

Clitics clearly play an important role in ASL grammar, particularly with respect to case marking. In fact, what we see in ASL is separation of the specification of thematic relations (source, goal and theme) which is a function of the locative argument/agreement markers and the specification of case relations (nominative vs. accusative) which is a function of the role prominence clitic and the classifier clitics. These clitics mediate in an important way between the syntactic arguments and locative agreement markers—i.e., between grammatical relations and thematic relations.

Furthermore, we have seen that locative relations can play an important role in the grammar, offering new insights into the locative basis of language in general. Yet, the ability to overtly reflect relations which are abstract but founded in locative notions, doesn't change the type of principles and parameters relevant to such a language.
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