THE NATURE OF GRAMMATICAL VALENCE

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This paper addresses two fundamental problems of grammatical structure. First, what is the nature of grammatical valence, i.e. what permits morphemes to combine to form grammatical constructions? Second, why is there a universal tendency for morphological layering to correlate with semantic scope, such that inner layers of morphological structure are semantically in the scope of outer layers? These questions are approached in the context of space grammar, which claims that grammar—both morphology and syntax—is symbolic in character and forms a continuum with lexicon. Discussion centers on a number of grammatical constructions found in languages of the Uto-Aztecan family.

1. Introduction

A common feature of Native American languages, and of languages generally, is the formation of complex verbs through the layering of "verb-like" derivational affixes. The Luiseño data in (1) is not atypical.

(1)(a) noo ŋee-q
I leave-TNS

'I am leaving.'

(b) noo ŋee-vič̆u-q
I leave-want-TNS

'I want to leave.'

(c) noo poy ŋee-ni-q
I him leave-make-TNS

'I make him leave.'

(d) noo poy ŋee-vič̆u-ni-q
I him leave-want-make-TNS

'I make him want to leave.'

(e) noo poy ŋee-ni-viču-q
I him leave-make-want-TNS

'I want to make him leave.'

(f) noo poy ŋee-viču-ni-viču-q
I him leave-want-make-want-TNS

'I want to make him want to leave.'

To me the most intriguing aspect of such constructions is the tendency for morphological layering to correlate with "semantic scope", so that an inner layer of structure is semantically "in the scope of" the affix constituting the layer immediately external to it.

The generative semantic account of this correlation is illustrated for (1)(d) in Figure 1 (cf. Langacker 1973). Scope is equated with subordination, and the surface complex verb is derived by repeated applications of rules such as Predicate Raising and Equi NP Deletion. However, there is no independent reason to believe that the root and derivational suffixes derive from clauses embedded to NP, and the whole notion of deriving the surface form from a radically different underlying structure is rather suspect.

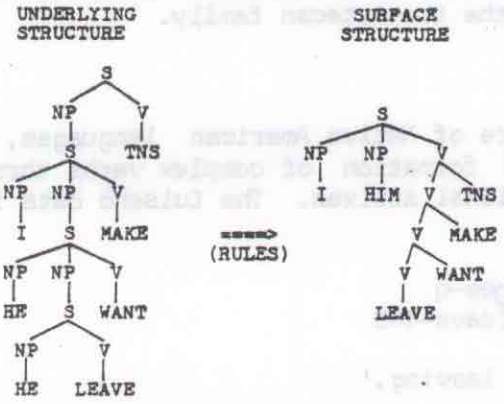

Figure 1

A predicate-argument account of such expressions is shown in Figure 2. While this dependency tree representation is much more satisfactory, in my view, it is nevertheless inadequate by itself. For one thing, special provisions are needed to specify the morphological layering of the complex verb. I will suggest, moreover, that predicate-argument representations of this kind are crucially inexplicit on a number of points.

Figure 2

My objective in this paper is to approach the correlation between semantic scope and morphological layering in the context of a broader conception of the nature of grammatical valence. I will try to provide a reasonably explicit preliminary account of what permits morphemes to combine and of the relation they bear to the composite whole. I will suggest that predicate-argument structures like Figure 2, while fairly prototypical, are nevertheless only a special case in a considerably broader spectrum of possibilities. The discussion will be based on selected grammatical constructions found in various languages of the Uto-Aztecan family.

2. An overview of space grammar

I will assume a descriptive framework called space grammar, only certain aspects of which can be outlined here, and these in the briefest possible terms.[1] Space grammar seeks to characterize a speaker's grasp of established linguistic convention. This knowledge is assumed to take the form of a structured inventory of conventional linguistic units, where a unit is a structural complex that the speaker has fully mastered. Only three basic types of units are posited: semantic, phonological, and symbolic. Symbolic units are bipolar, with a semantic unit at one pole in symbolic correspondence to a phonological unit at the other. The inventory of conventional units is structured in that some units function as components of others; the long vowel [ee], for instance, is one component of the phonological unit [[ŋ]-[ee]] in Luiseño, which in turn is a component of the symbolic unit [[LEAVE]/[[ŋ]-[ee]]], and so on.

Three facets of the model must be explicated in slightly greater detail: schematicity, grammatical structure, and semantic structure. Schematicity is the relation between superordinate and subordinate nodes in a taxonomic hierarchy. For example, the concept [TREE] is schematic relative to more highly elaborated concepts such as [OAK] or [PINE]; and superordinate to phonological units such as [a] and [ee] we can posit the schematic phonological unit [VOWEL]. A schema is said to be elaborated by the structures subordinate to it, called its instantiations, and this elaborative relation is indicated by an arrow, e.g. [TREE]→[OAK]. Relatively speaking, a schema specifies a notion only in gross terms, while its instantiations specify it in finer detail—it is like the difference between a graph of the stock market plotted on a coarse grid, showing only general trends from month to month, and a graph plotted on a fine grid, showing the day-to-day fluctuations giving rise to the general trends. The conventional units of a grammar include both schemas and their instantiations. Schemas have a categorizing function and also a sanctioning function in the creation of novel expressions. Relations of schematicity also play a role in grammatical valence, and that is our basic concern here.

Space grammar does not posit special morphological or syntactic units. Grammatical structure, both morphology and syntax, is claimed to be symbolic in nature, forming a continuum with lexicon. It is therefore accommodated by symbolic units, each consisting of a semantic and a phonological pole. Grammatical patterns, or "rules", are represented in the form of schematic symbolic units.

Let us take the combination of Luiseño -viču 'want' with a verb stem for a concrete illustration. What do we have to say to describe fully a grammatically complex form such as ŋee-viču 'want to leave'? First we must characterize the two component morphemes, each of which is a symbolic unit with a semantic and a phonological pole. The second task is to specify precisely how the two morphemes combine—this is the problem of grammatical valence. For now I simply observe that the combination is bipolar and therefore symbolic. It is bipolar in the sense that we must state not only how the phonological units [ŋee] and [viču] integrate to form the composite phonological structure [ŋee-viču], but also how the semantic units [LEAVE] and [WANT] integrate to form the composite semantic structure [LEAVE-WANT]. Moreover, the phonological integration symbolizes the semantic integration: the fact that the wanting designated by -viču pertains to leaving in particular (rather than some other process) is conveyed specifically by the fact that -viču suffixes to ŋee 'leave' rather than some other stem. In short, the semantic relation between the meaning components [LEAVE] and [WANT] is symbolized by a specific relation (one of suffixation) between their respective phonological representations.

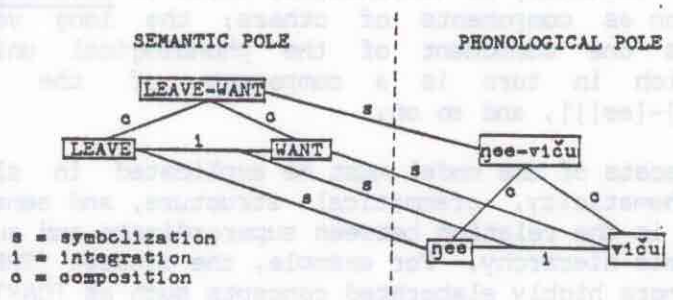

Figure 3

Figure 3 summarizes these relations of symbolization and integration. It shows an integrative relation between the semantic units [LEAVE] and [WANT], to yield the composite semantic structure [LEAVE-WANT], and also between the phonological units [ŋee] and [viču] to yield the composite phonological structure [ŋee-viču]. It shows symbolic relations between [LEAVE] and [ŋee], between [WANT] and [viču], and between the modes of integration of [LEAVE] and [WANT] at the semantic pole and of [ŋee] and [viču] at the phonological pole. Because the composite structures [LEAVE-WANT] and [ŋee-viču] are defined by their components together with their mode of integration, these composite structures themselves stand in a symbolic relationship derivative of the ones linking their components and the integration of these components.

While all this may strike one as an overly complicated way to describe a simple case of suffixation, in actuality it is not. All I have done is to make explicit reference to all of the facets of structure and organization that go into a stem-suffix combination, believing that all of these facets of structure and organization must ultimately

be described in full detail rather than simply being taken for granted, as they normally are. An account of each of the structures and relations in Figure 3 is the minimum required for an adequate description of a simple instance of grammatical valence between two morphemes. Figure 3 of course represents a specific instance of the general pattern whereby -vičU combines with a verb stem. The pattern itself—the space grammar equivalent of a morphological or derivational rule—will simply be a schematic version of 3, one in which the specifications of ŋee 'leave' are replaced by those of the verb stem schema. This schematic symbolic unit which embodies the morphological pattern coexists in the grammar of Luiseño with those of its instantiations which have been mastered by speakers as established units.

Semantic structure is viewed in space grammar as conventionalized conceptual structure, i.e. the form our conceptualizations must assume for ready linguistic expression given the symbolic conventions and resources of the language. A semantic structure is a conceptualization that functions as the semantic pole of a morpheme or larger expression, fixed or novel. I refer to the semantic pole of a morpheme as a predicate.

A predicate is characterized relative to one or more conceptual domains, collectively referred to as its matrix. Some are basic domains, i.e. primitive fields of representation not reducible to other, more fundamental concepts; examples of basic domains would include space, time, color, taste, and one or more emotive domains. Most domains are abstract. An abstract domain consists of a functional assembly, i.e. an integrated knowledge structure of some kind. Random examples of functional assemblies include our conception of the human face, knowing how to skin a rabbit, the calendrical cycle, the notion that objects or events can be ranked on a scale with respect to some property, and so on almost indefinitely.

It is important to observe that functional assemblies—and hence the domains relative to which predicates are defined—are structured hierarchically, in that simpler assemblies can be coordinated or transformed to create more complex, higher-order assemblies, which in turn combine to form more complex assemblies, and so on. It is crucial that a given predicate be defined at an appropriate level in this hierarchy of complexity. For example, it would be pointless to try to define the notion [RADIUS] directly in the basic domain of two-dimensional space, since a radius exists only by virtue of its relation to a circle and hence is superordinate to the [CIRCLE] concept in the hierarchy of complexity. We must approach the characterization of [RADIUS] in two steps. First, [CIRCLE] can be defined as a configuration of points in the basic spatial domain. Then, since [CIRCLE] is a coherent conceptual complex, or functional assembly, it can serve as an abstract domain for the characterization of [RADIUS].

It is claimed that the semantic structure of a predicate always involves a profile relative to a base. This is one of several levers of figure/ground organization posited in the space grammar account of linguistic structure. The base (or ground) is the domain, or some relevant subportion of the domain. The profile (or figure) is that

portion of the base which the predicate designates. Neither the base nor the profile is sufficient in itself to define a predicate, which consists precisely in the relation between the two. Without the base, the profile cannot be identified; without the profile, the base makes no designation.

These notions are illustrated for [CIRCLE] and [RADIUS] in Figure 4. Boldface is used for profiled entities. The base for [CIRCLE], in 4(a), is the basic domain of two-dimensional space. The profile for this predicate, what the predicate designates, is a configuration or set of points in this domain. As a functional assembly, [CIRCLE] can then serve as base for the characterization of [RADIUS], as seen in 4(b). Observe that the conception of a circle is part of the predicate [RADIUS]; this configuration is in the base of [RADIUS] but is not profiled, though precisely the same configuration functions as the profile of the predicate [CIRCLE].

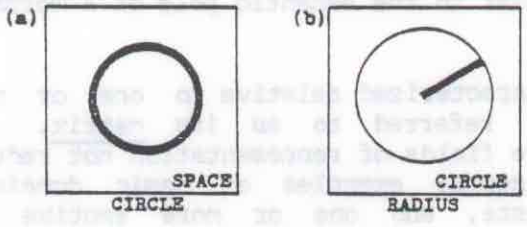

Figure 4

Predicates fall into several basic types determined with respect to the nature of their profile. A thing is a predicate whose profile is construed as a bounded region in some domain. Both [CIRCLE] and [RADIUS] are classified as things, since they are lines, and lines are a special type of bounded region in space. [YELLOW]—as a noun, the name of a color—is a bounded region in the color domain, defined primarily by its location along the hue dimension. To take more abstract examples, [PARAGRAPH] is a bounded region in a written passage, [TUESDAY] a bounded region in the cycle of days constituting a week, and [OCTAVE] a bounded region on a musical scale. Physical objects, as bounded entities in three-dimensional space, are prototypical members of the thing category, but nevertheless represent a special case in the spectrum of possibilities defined by its schematic characterization.

A relation is defined as a predicate in which two or more entities are profiled. Typically a relation profiles two things, as seen for the [IN] relation in Figure 5(a). (I will use a circle as a convenient abbreviation for a thing.) However, either or both of the profiled entities may themselves be relational in character. [FAST], for example, locates a process in a particular region along a scale of rapidity. The conception of such a scale constitutes an abstract domain, and [FAST] profiles both the process being situated along the scale and that region of the scale consisting of the set of points beyond the neighborhood of the norm (n). In every relational predication, one of the profiled entities is designated as the trajector, and the other as the landmark.

This distinction constitutes a second layer of figure/ground organization, one superimposed on the figure (profile) of a more fundamental layer of figure/ground organization, namely the profile/base distinction. As the terms suggest, the landmark entity functions as a point of reference for specifying the location of the trajector.

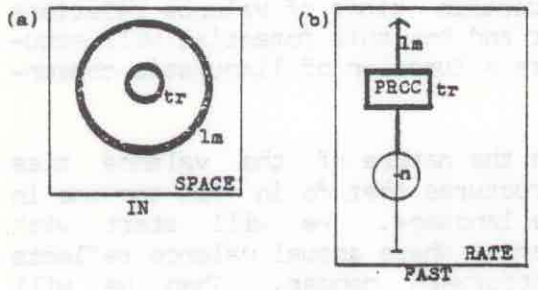

Figure 5.

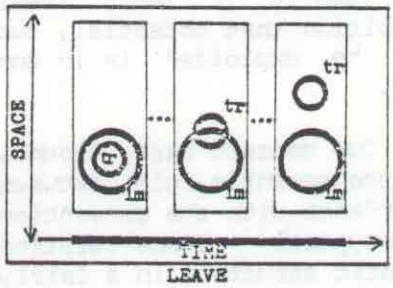

Figure 6

Like things, the relations considered above are stative, i.e. they are conceptualized as static configurations in their domain, scanned as a simultaneously available whole. A process is more complex and involves the tracking of a configuration through time. It can be regarded as a continuous series of states occupying a continuous series of points in time and scanned sequentially; a process is thus seen as unfolding through time, and the span of time though which it is tracked is referred to as its temporal profile. Essential facets of the processual predicate [LEAVE] are sketched in Figure 6. The matrix for this predicate is complex, as it coordinates the basic domains of time and space; the boldface portion of the time arrow is the temporal profile of the process.

3. Grammatical valence: canonical instances

Grammar consists in the combination of symbolic structures to form progressively more complex symbolic structures. I have suggested that this combination is bipolar, with the integration of semantic representations standing in a symbolic relation to the integration of their corresponding phonological representations. Our main concern here is with the nature of this integration at the semantic pole. What precisely is the nature of the semantic integration that forms a composite semantic structure from two or more component predicates?

I want to make it clear at the start that I am not concerned with trying to predict the valence of a morpheme on the basis of its internal semantic structure. In fact, I do not think it is possible to predict valence in absolute terms. There is no reason to suppose, for instance, that the semantic pole of Luiseño ŋee 'leave' is substantially different in any crucial respects from that of English leave, yet ŋee is

consistently intransitive, while leave optionally bears a valence relation of some kind to a nominal complement (this very optionality actually establishes the point):

(2)(a) The man left.
(b) The man left the building.

Instead of absolute predictability, we must settle for predictability of a weaker sort, one more generally appropriate for language: The semantic structure of a morpheme defines its valence potential and determines how readily it lends itself to certain kinds of valence relations exploiting that potential, but whether and how this potential will actually be exploited is in some measure a function of linguistic convention.

Our concern here, though, is with the nature of the valence ties (at the semantic pole) between two structures that do in fact combine in accordance with the conventions of the language. We will start with prototypical valence relations, instances where actual valence reflects semantic structure in a fairly straightforward manner. Then we will consider cases which deviate from the prototype in various ways.

Consider this Hopi sentence:[2]

(3) taaqa moosa-t tiwa
man cat-ACC see/find

'The man found the cat.'

The Hopi verb tiwa is a fairly canonical instance of a two-place predicate, in standard predicate-argument terms, since it designates a relation between two salient entities, a searcher/perceiver and the object sought/perceived. Figure 7 is a typical predicate/argument dependency tree representation for the lexical morphemes of (3), showing valence relations between [FIND] and its arguments [MAN] and [CAT].

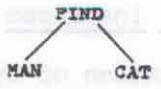

Figure 7

Though I find Figure 7 perfectly acceptable as a first approximation, it is undeniably inexplicit on many crucial points. For one thing, nothing of substance is indicated about the internal structure of any of the three predicates. Second, nothing explicitly shows that [MAN] and [CAT] have different roles with respect to [FIND], or what these roles are. Third, how [MAN] and [CAT] connect to [FIND], and what permits this combination in the first place, are left unspecified. Finally, there is no direct characterization of the composite semantic structure resulting from the integration of the three components.

The space grammar conception of grammatical valence (for prototypical instances) can be regarded as an attempt to be explicit on all these points, i.e. to explicate the valid intuitions that lie behind the widespread acceptance of some version of predicate-argument structure. We can begin with a characterization of the internal structure of the predicates, most crucially [FIND]. The matrix for this predicate is complex, involving not only the domain of physical space but also abstract domains pertaining to perception and cognition, including the knowledge that perceiving individuals, at a given time, have perceptual access to a limited area and make perceptual contact only with objects located within this perceptual field. I have conflated these different domains in Figure 8, which certainly oversimplifies matters, but will be sufficient for present purposes.

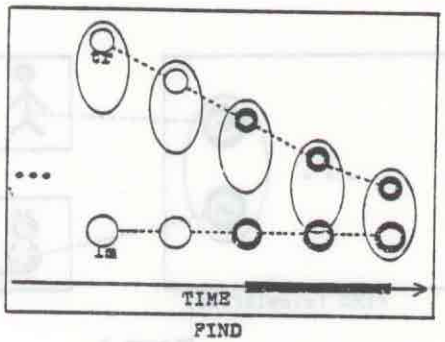

Figure 8

[FIND] traces through time the evolution of a situation involving several entities. Two of these entities, both physical objects, are profiled: the trajector, corresponding to the searcher, functions as the figure within the relational profile, and its activity is plotted relative to the landmark, the object sought and found. Less salient but still important in this conception is a third entity, the perceptual field of the trajector, which I have given as an ellipse. The base of [FIND] includes a search process of indefinite duration. Only the final stages of that process are actually designated by the predicate and hence profiled, namely the transition into the situation where the landmark is located in the trajector's visual field.

I will treat [MAN] and [CAT] in much lesser detail, using only a mnemonic sketch representing their shape specification in diagrams below. For our purposes, the relevant observation is that they are prototypical things, bounded objects in physical space. Their full characterization will include specifications in numerous other domains (e.g. size, color, canonical activities).

Now let us consider the valence relations in Figure 7. I will suggest that a valence relation between two predicates is possible just in case these predicates overlap, in the sense that some substructure

within one corresponds to a substructure within the other and is construed as identical to it. I will use dotted lines for correspondences of this kind.[3] The dotted lines of correspondence in Figure 9 therefore specify that the trajector of [FIND] is construed as being identical to the object profiled by [MAN], and that the landmark of [FIND] is construed as being identical to the profile of [CAT]. Establishing these correspondences is what permits [FIND] to combine with [MAN] and [CAT] in a grammatical valence relation. The lines of correspondence can also be thought of as lines of integration, i.e. as instructions for fitting the component predicates together to form a coherent composite structure. In Figure 9, then, the lines of integration indicate that the specifications of [MAN] are to be superimposed on those of the trajector of [FIND], and the specifications of [CAT] on those of the landmark of [FIND], since their profiles correspond to different substructures within it.

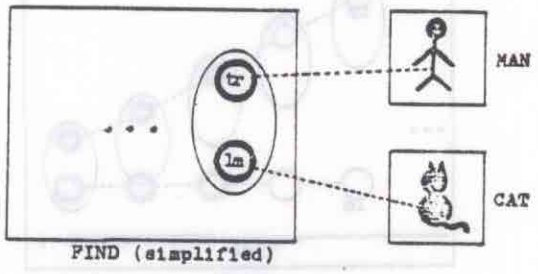

Figure 9

I will claim that all valence relations are based on correspondences between subparts of the component structures. This is in fact the only constant factor in valence relations. However, there is considerably more that can be said about canonical valence relations like those in Figure 7, and that we must say to be fully explicit about their nature.

For example, what is the nature of the asymmetry between [FIND] on the one hand and [MAN] and [CAT] on the other that leads us to put [FIND] on top in the dependency tree and the others on the bottom? What leads us to say, in predicate-argument terms, that [FIND] is the predicate, and [MAN] and [CAT] the arguments, rather than the converse? I would suggest that this asymmetry is connected with the relational character of [FIND]. [FIND] introduces and organizes a scene in which salient participants interact in a specified way. [MAN] and [CAT] designate individual objects, and while it is part of our knowledge of these objects that they participate in relations with other objects, these external relationships are neither salient nor profiled within these predicates. [FIND] thus makes salient reference to two objects as part of its own internal structure—these objects function as its trajector and landmark and define its profile—while neither [MAN] nor [CAT] profiles an external relation.

I will say that [FIND] is conceptually dependent, while [MAN] and [CAT] are conceptually autonomous, with respect to the entities placed in correspondence in Figure 9. [FIND] is conceptually dependent because it presupposes, as an inherent part of its own internal structure, the two things participating in the correspondences; [MAN] and [CAT] are conceptually autonomous because they do not similarly presuppose a salient external relationship. One cannot conceptualize the [FIND] relation without conceptualizing the two things functioning as trajector and landmark of that relation (even if they are conceived only in the vaguest terms, say as blobs), but it is perfectly possible to conceptualize a man or a cat without mentally setting it in a relation with some external object. I would emphasize that conceptual autonomy and dependence are ultimately matters of degree, but in canonical instances of grammatical valence there is a fairly clear asymmetry between the dependent and autonomous predicates along these lines. The dependent structure can be equated with the predicate, in predicate-argument terms, and the autonomous structures with its arguments. That is, the conceptually dependent structure in such a configuration can be said to have valence, and the autonomous structure satisfies this valence.

Though [FIND] and the two autonomous predicates in Figure 9 profile corresponding objects, they obviously differ in the degree to which the nature of these objects is specified. [FIND] characterizes its trajector and landmark only in schematic terms—the former only as a thing capable of searching and perceiving, the latter only as a thing capable of being found—while [MAN] and [CAT] specify the corresponding objects in far greater detail. Hence there is a relation of schematicity between each of the profiled objects within [FIND] and the autonomous predicate whose profile corresponds to it. We can say that the dependent predicate organizes the scene, setting up a relation between schematically specified objects, and that the autonomous predicates fit into this scene and elaborate particular substructures within it. These substructures can be called elaboration sites (e-sites); they are cross-hatched in Figure 10 for ease of identification. The arrow leading from an e-site in the dependent predicate to the corresponding autonomous predicate thus stands for a schematic relationship, as before.

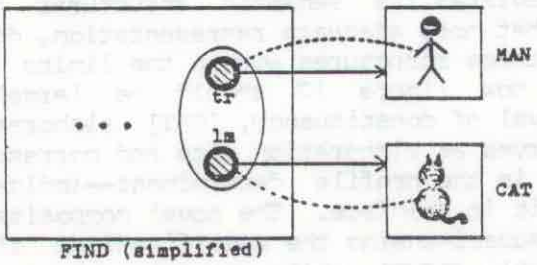

Figure 10

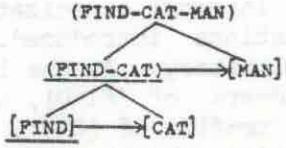

Figure 11

Two further aspects of canonical valence relations must be considered. The first is constituency, the order in which simpler structures combine to form progressively more complex ones. I can say little about constituency here. There is reason to think that it is often variable, with alternate constituency options leading to the same overall composite structure. Typically constituency is binary, and there is evidence that two-place predicates normally elaborate their landmark at a lower level of constituency, with the trajector being elaborated at a higher level. Figure 11 thus shows the likely organization of the example under consideration. At the lower level of constituency, [FIND] and [CAT] are integrated to form the composite structure (FIND-CAT), which is taken to be novel (hence the parentheses rather than the square brackets). The schematicity arrow indicates that [FIND] is the dependent structure, and [CAT] the autonomous one; more specifically, [CAT] elaborates the landmark of [FIND]. At the higher level of constituency, [MAN] is integrated with the composite structure (FIND-CAT) to form the higher-order composite structure (FIND-CAT-MAN). Here (FIND-CAT) is dependent, and the autonomous structure [MAN] elaborates its trajector.

The underscores in Figure 11 relate to the final aspect of canonical valence relations. Consider the lower level of constituency. [FIND], a process predicate, integrates with [CAT], which has the profile of a thing. What, then, will be the profile of the composite structure (FIND-CAT)? Will it designate a thing or a process? Clearly moosat tiwa 'found the cat' designates a process, not a thing; it is the core of a clause, and a clause by definition is processual in nature. However, there is no inherent reason why the composite structure would have to inherit the profile of the dependent component rather than the autonomous one—the choice must be specified as part of each grammatical construction. In a canonical valence relation, then, one of the component structures must be singled out as the profile determinant, which means that its profile prevails in determining the character of the composite structure. The underscores in Figure 11 mark the profile determinants. (FIND-CAT) is thus a process, for it inherits the processual profile of [FIND]. At the second level of constituency, similarly, (FIND-CAT) is marked as the profile determinant, so the composite structure for the entire expression is also processual, and (3) qualifies as a clause.

Figure 11 of course abbreviates the semantic structures at each level. Figure 12 is a somewhat more adequate representation, depicting the internal organization of these structures within the limits of the notations introduced. By now Figure 12 should be largely self-explanatory. At the lower level of constituency, [CAT] elaborates the landmark of [FIND], which serves as elaboration site and corresponds to the profile of [CAT]. [FIND] is the profile determinant—indicated by putting the box surrounding it in boldface. The novel composite structure (FIND-CAT) is formed by superimposing the specifications of [CAT] on the schematic landmark within [FIND], while retaining the processual profile of the latter. (FIND-CAT) is therefore a process structure with unspecified trajector. This trajector is elaborated at the second level of constituency, where it is put in correspondence with the profile of [MAN]. Since (FIND-CAT) is the profile determinant, the novel composite

structure (FIND-CAT-MAN) is a process whose trajector receives the specifications of [MAN].

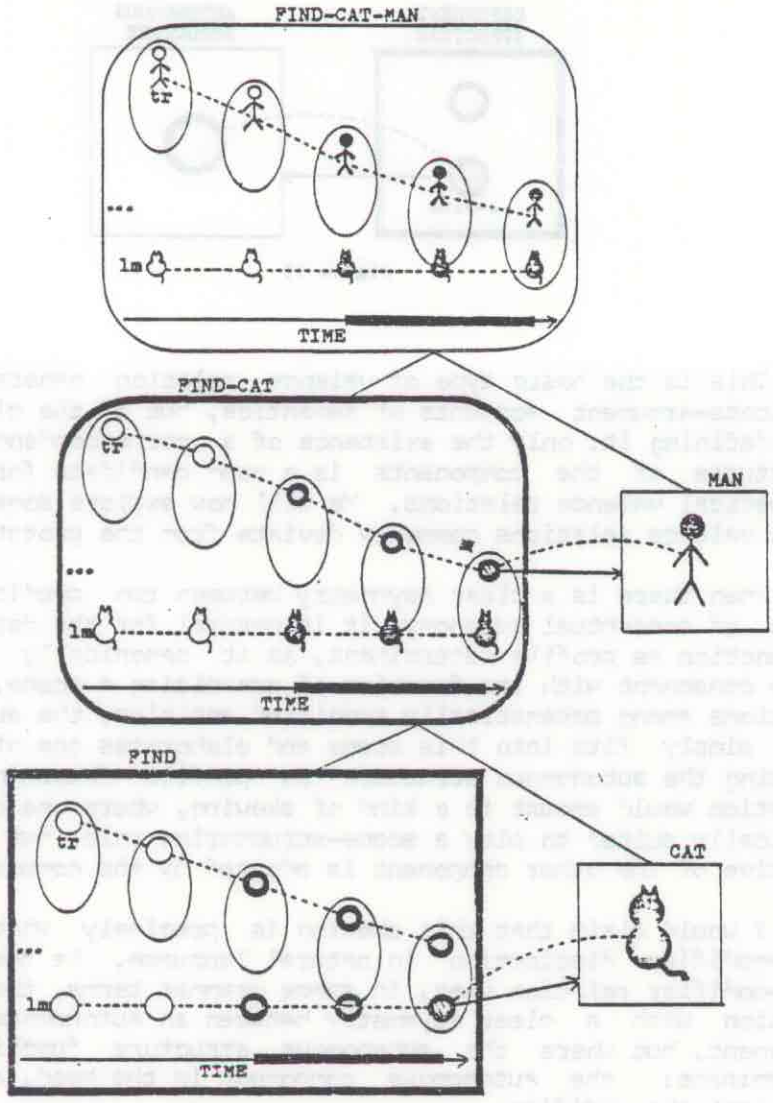

Figure 12

4. Non-canonical instances of grammatical valence

The essential aspects of a canonical valence relation are summarized in Figure 13. It is a binary relation between two predicates, one of which is autonomous and the other dependent. The dependent structure is relational and includes within its profile an entity, specifically a thing, which corresponds to the profile of the autonomous structure. This entity, only schematically specified within the dependent structure itself, functions as an elaboration site; this e-site bears a relation of schematicity to the autonomous structure, which serves to specify it in finer detail. Finally, the dependent structure is the profile determinant and hence imposes its relational profile on the composite structure.

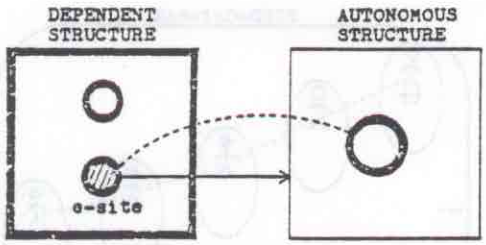

Figure 13

This is the basic type of valence relation generally assumed in predicate-argument accounts of semantics, but of the cluster of properties defining it, only the existence of a correspondence between substructures of the components is a good candidate for universality in grammatical valence relations. We will now explore some of the ways in which valence relations commonly deviate from the prototype.

When there is a clear asymmetry between two predicates along the lines of conceptual autonomy, it is natural for the dependent structure to function as profile determinant, as it canonically does. This is quite consonant with its function of organizing a scene, of establishing relations among schematically specified entities; the autonomous structure simply fits into this scene and elaborates one of these entities. Choosing the autonomous structure as profile determinant in such a situation would amount to a kind of skewing, where one component is intrinsically suited to play a scene-structuring role, but where the perspective of the other component is adopted by the composite structure.

I would claim that this skewing is precisely what underlies the head-modifier distinction in natural language. We normally speak of a head-modifier relation when, in space grammar terms, there is a valence relation with a clear asymmetry between an autonomous and a dependent component, but where the autonomous structure functions as profile determinant: the autonomous component is the head, and the dependent component the modifier.

The Hopi expressions in (4) are representative.

(4) (a) taaqa wiipa
man tall

'The man is tall.'

(b) wiipa-taqa
tall-man

'tall man'

(4)(a) is clausal, hence relational in character, and here we would normally speak of a subject-predicate relation between taaqa and wiipa.

(4)(b), on the other hand, is nominal in character, and in this case it is customary to speak of a head-modifier relation. Yet in both instances [MAN] is autonomous and elaborates the trajector of the dependent [TALL], as seen in Figure 14(a). [TALL] designates a relation between an object and an abstract scale. This scale is based on the functional assembly of comparing objects with respect to their vertical extension when they assume their canonical vertical orientation. [TALL] specifies that the upper extreme of the trajector, with respect to this orientation, falls in the landmark region of the scale, which consists of the scale's positive end, that portion beyond the neighborhood of the norm.

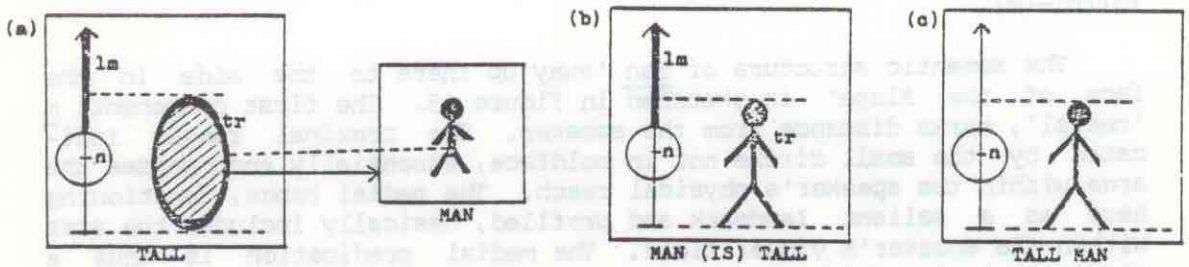

Figure 14

The relationships shown in 14(a) are valid for both (4)(a) and (4)(b), yet these expressions are quite different in meaning. They differ precisely in that (4)(a) is relational, while (4)(b) designates an object and therefore has the profile of a thing. It seems apparent, then, that the composite semantic structure in (4)(a) inherits the profile of [TALL], and in (4)(b) the profile of [MAN]. The respective composite structures are shown in 14(b) and (c). Observe that in each instance a predication of tallness for the man is present—the only difference lies in whether that relation is profiled or whether it is merely part of the base.

The difference between an adjectival and an adverbial modifier is simply that the latter has a relation rather than a thing for its trajector and elaboration site. Consider the expression run fast. [FAST] was diagrammed in Figure 5(b). Its trajector is a process rather than a thing. This schematic process is elaborated by [RUN] in a way precisely analogous to the way in which [MAN] elaborates the trajector of [TALL] in tall man. [RUN] is clearly the profile determinant in run fast, since this expression designates a type of running, not a type of rapidity—the composite structure is quite analogous to Figure 14(c). It will be observed that the notion adverb receives a very simple characterization in space grammar terms: an adverb is a modifier whose head is a relation (as opposed to a thing).

We have now seen two ways in which valence relations can depart from the prototype: the autonomous structure may function as profile determinant, and the e-site within the dependent structure may be a relation rather than a thing. Additional kinds of departure from the prototype can be illustrated by a series of composite locative particles in Core.

The particular locative particles in question are specialized for topographical relations in mountainous terrain. Representative examples are given in (5)(a) and (b).

(5)(a) yuu 'right here at the foot of the slope'
(b) mah 'away up there to the side in the face of the slope'
(c) y 'proximal'/m 'medial'/Ø 'distal'
(d) u 'inside'/a 'outside'
(e) : 'foot of slope'/h 'face of slope'/n 'top of slope'

These particles prove to be essentially regular combinations of three morphemes each. The possibilities for each position are given in (5)(c)-(e).

The semantic structure of mah 'away up there to the side in the face of the slope' is sketched in Figure 15. The first component, m 'medial', marks distance from the speaker. The proximal range, indicated by the small circle not in boldface, essentially encompasses the area within the speaker's physical reach. The medial range, functioning here as a salient landmark and profiled, basically includes the area within the speaker's visual field. The medial predication is thus a stative relation which locates the trajector within the medial range but outside the proximal area.

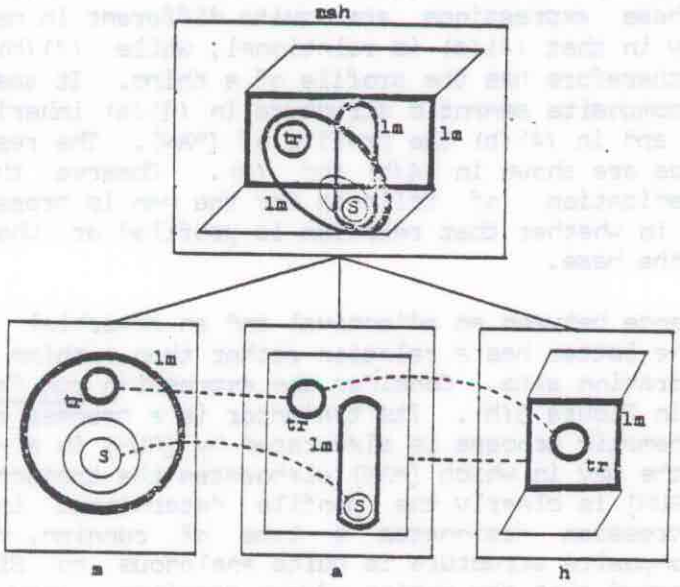

Figure 15

The general contrast in Cora between u 'inside' and a 'outside' assumes specialized values in particular contexts. The specific versions of u and a relevant here are defined relative to the functional assembly in which the speaker is standing at the foot of a slope and looking straight up the face of this slope. This slope (including the foot, the face, and the top) is represented by a rectangle. The

landmark area for u and a is defined as the area along the speaker's line of sight as he looks up the slope from this canonical position. It will be noted that this landmark region extends along the face of the slope only to the skyline, since the speaker's line of sight from the foot of the slope cannot curve to take in the region on top. The morphemes u and a designate stative locative relations, situating the trajector either inside or outside the landmark region along the speaker's canonical line of sight; a 'outside' is of course shown in Figure 15.

Finally, h indicates that the trajector is located in the face of the slope, as opposed to the foot or the top. Its representation in Figure 15 should be self-explanatory, as should be the lines of integration connecting the three component predicates. It is an obligatory specification of this construction that the trajectors of the three predicates correspond. The speaker is obviously the same in the first two components, and the slope is the same in the second two. The three predicates are therefore tightly integrated by lines of correspondence connecting shared substructures.

The composite structure is obtained simply by superimposing corresponding entities. The result is a complex locative relationship in which the trajector is simultaneously located with respect to three parameters and three landmarks, one contributed by each component predicate. Taken together these add up to a fairly precise specification that can be glossed as in (5)(b).

This construction departs from prototypical valence relations in three ways. First, the construction is not binary. There is no apparent reason to break the three-morpheme sequence down into two levels of constituency; the three specifications are essentially coordinate. Second, there is no obvious sense in which any of the components is conceptually dependent relative to the others, hence there is no e-site. Finally, it is unnecessary to specify any of the three component predicates as profile determinant. The composite expression mah does not designate any of the three component locative relations in particular, but rather the complex locative relation defined by coordinating the locative specifications along the three parameters.

Still other types of departures from canonical valence relations can be illustrated by the Cahuilla data in (6).

(6)(a)	ne-'aš kiyul	(a') ne-'aš tamawet
	my-pet fish	my-pet mockingbird
	'my fish'	'my mockingbird'
(b)	ne-wes-'a navet	(b') ne-wes-'a sandiya
	my-plant-NR cactus	my-plant-NR watermelon
	'my cactus'	'my watermelon'

This is a type of noun-classifier construction frequently found in Uto-Aztecan possessive expressions. Instead of going directly on the

possessed noun, the possessor prefix attaches to a more abstract noun, or classifier, to which the possessed noun stands in some sort of appositive relation. Cahuilla has a whole series of classifiers, only two of which are exemplified here.[6] The classifier 'aš is used for domesticated animals, or pets, and wes-'a, a nominalization of the verb stem 'plant', is used for crop plants sown in a row.

The semantic structure of (6)(a) is sketched in Figure 16. At the lower level, [MY] functions as a modifier of [PET]. I will assume that any kind of relation between two entities can be used to define an abstract neighborhood for which one of those entities functions as landmark—any entity which bears the designated relation to this landmark is construed as being located in its neighborhood with respect to this relation. A possessive structure such as [MY] is highly schematic; essentially, [MY] only locates a trajector in the neighborhood of the speaker with respect to a relation of unspecified character.[7] [PET] is a relational noun: it has the profile of a thing, identified schematically only as an animal of some kind, but its relation to another, landmark entity is a prominent feature of its base. This relationship, one of ownership, puts the profiled animal in the control domain of the landmark, which is equated by a line of integration with the abstract neighborhood internal to the possessive [MY]. Similarly, the landmark of [MY] is equated with the landmark of [PET], and the trajector of [MY] with the profile of [PET], which is the profile determinant. By superimposing corresponding entities, we arrive at the composite structure [MY-PET], which designates a thing, specified as an animal, that falls in the neighborhood of the speaker with respect to a relation of ownership or control.

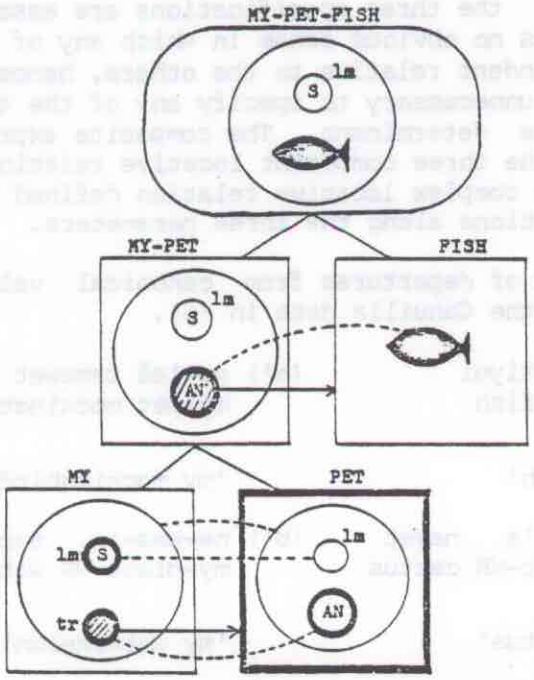

Figure 16

Our main concern in this example is with the second level of constituency, where ne-'aš 'my pet' combines with kiyul 'fish'. The profile of [FISH] corresponds to the schematically characterized profile of [MY-PET] and of course specifies its properties in much greater detail. Hence the schematic profile within [MY-PET] is an e-site, elaborated by [FISH], and [MY-PET]—by analogy to canonical valence relations (Figure 13)—can be considered a dependent structure. For us the important point about this valence relation is that the dependent structure is non-relational: [MY-PET] has the profile of a thing, yet it bears a valence relation to [FISH]. There is no reason why this cannot be so in the space grammar conception of grammatical valence, since valence depends crucially only on correspondences. A second noteworthy aspect of this construction is that it is unnecessary to designate one of the components as profile determinant, but for a different reason than in the Cora example: the profiles correspond fully, so either choice yields the same composite structure. Because there is no clear-cut profile determinant, we lack the basis for positing either a head-modifier or a predicate-argument relation; the construction is basically appositional.

For subsequent examples, I will adopt the abbreviatory notational conventions given in Figure 17. A line between two profiled entities indicates that they participate in a stative relation, which may be either specified or schematic. Only one component state is shown explicitly in the abbreviation for a process, but it should be understood that there is one such state for each point in the temporal profile, represented by the boldface portion of the time arrow. By convention, the upper profiled entity in these abbreviatory notations is the trajector, and the lower one is the landmark.

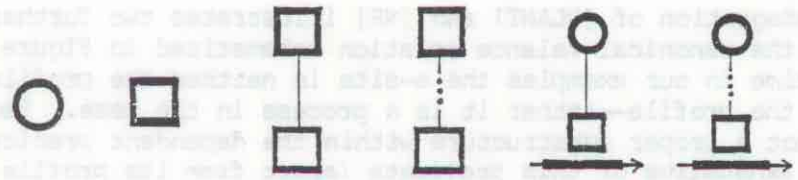

Figure 17

Figure 18 gives the semantic structure of ne-wes-'a 'my plant', the classifier portion of (6)(b). Here we are mostly concerned with the lower level of constituency, where the nominalizer -'a combines with the verb stem wes 'plant'. [PLANT] is a process predicate, abbreviated with the notation just introduced. The nominalizing predicate defines a thing by virtue of the role it plays in a process. As conceived in space grammar, then, the base of the nominalizing predicate consists of a schematic process, and its profile is the landmark of this process. The entire schematic process constituting the base functions as e-site, and [PLANT] elaborates it. Since the nominalizer is the profile determinant, the composite structure designates a thing, namely one characterized as the landmark of the process of planting.

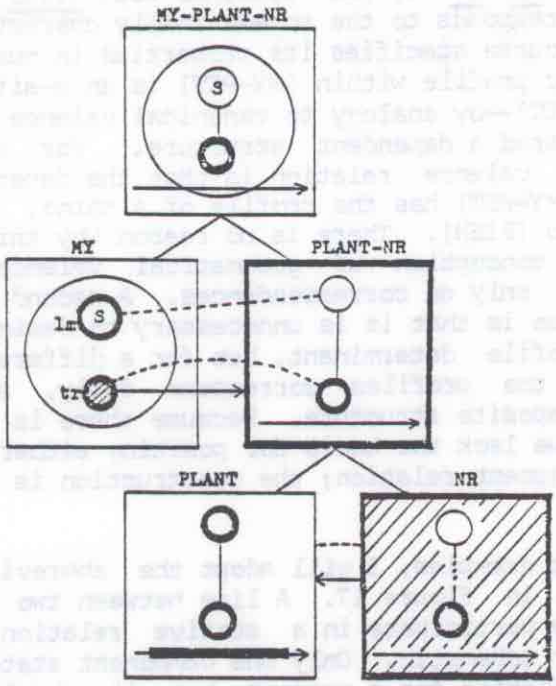

Figure 18

The integration of [PLANT] and [NR] illustrates two further departures from the canonical valence relation schematized in Figure 13. For the first time in our examples the e-site is neither the profile nor a subpart of the profile—rather it is a process in the base. Second, the e-site is not a proper substructure within the dependent predicate, but is in fact exhaustive of this predicate (apart from its profile specification). It is of course not unexpected, as a limiting case, that the designated substructure might coincide with the whole.

At the second level of constituency, the trajector of [MY] corresponds to the profile of [PLANT-NR], parallel to the previous example. Additional correspondences account for the fact that the possessive predication furnishes a periphrastic specification of the unspecified trajector (subject) within the verb stem wes 'plant' of wes-'a. Though it has not been convenient to represent it pictorially in Figure 18, the relation defining the possessive neighborhood within [MY] is equated with the [PLANT] relation constituting the base for [PLANT-NR]. Accordingly, the landmark of [MY] is integrated with the trajector of the [PLANT] relation, so that the planter is identified with the speaker in the composite structure [MY-PLANT-NR]. I have not shown the third level of constituency, where ne-wes-'a 'my plant(ing)' combines with an appositional noun such as navet 'cactus', since it is exactly analogous

to the previous case.

We may now summarize the various ways in which a grammatical valence relation can depart from the prototype. A valence relation need not be binary, and it is not necessary that there be a clear asymmetry between an autonomous and a dependent structure. If there is such an asymmetry, the dependent structure need not be relational, and its e-site does not have to be a thing included in the profile: it can be a relation rather than a thing, and it can be an unprofiled facet of the base (and even subsume the base). Either the autonomous or the dependent structure can function as profile determinant, and in some instances the components contribute equally to the profile of the composite structure. Finally, a valence relation often involves multiple lines of integration. The existence of at least one line of integration is perhaps the only invariant feature of valence relations.

5. Scope and morphological layering

To conclude, we return at last to the problem posed at the outset, namely the tendency for morphological layering to correlate with semantic scope, as illustrated by the Luiseño sentences in (1). The present conception of grammatical valence allows a straightforward account of such expressions which avoids the problems encountered by the generative semantic and predicate-argument approaches.

Let us focus on (1)(d), repeated here as (7).

(7) noo poy ŋee-vicu-ni-q
I him leave-want-make-TNS

'I make him want to leave.'

The semantic pole of its probable constituency tree is given in Figure 19.

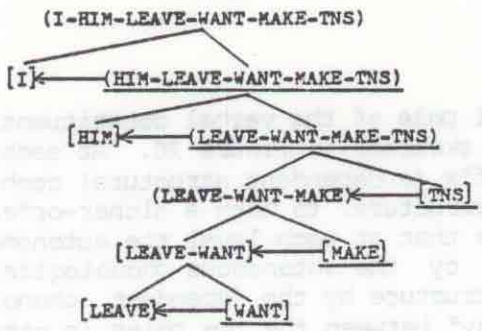

Figure 19

We are primarily interested in the verbal constituent (LEAVE-WANT-MAKE-TNS). Two factors combine to account for the correlation between

morphological layering and semantic scope. First, at each level in the constituency hierarchy at the semantic pole, the dependent structure is also the profile determinant—this is the canonical alignment, and it amounts to what was recognized as "semantic scope" in the generative semantic framework. At the lowest level, for instance, [LEAVE] elaborates the landmark of [WANT], hence [WANT] is dependent; [WANT] is also the profile determinant, since ŋee-viču 'want to leave' is a kind of wanting, not a kind of leaving. Thus [WANT] imposes its profile on the composite structure, overriding the profile of [LEAVE], and this relationship is what people have in mind when they say that [LEAVE] is "in the semantic scope of" [WANT].

The second factor pertains to integration at the phonological pole, which I have largely ignored until now. I would claim that the notions of autonomy and dependence are equally important at the phonological pole in valence relations as at the semantic pole. In the case of word structure, they amount to the distinction between root and stem on the one hand and affix on the other. An affix is morphologically dependent in the sense that it is characterized in part by its position relative to a root or stem, and thus makes inherent reference to a schematically specified root or stem as part of its own internal structure. This schematic stem within each affix serves as elaboration site in a valence relation and is elaborated by a specified stem. A root or stem is autonomous in the sense that it makes no internal reference to another phonological entity relative to which it is positioned.

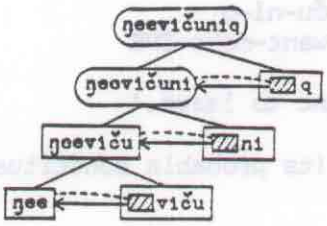

Figure 20

The phonological pole of the verbal constituent ŋee-viču-ni-q 'make want to leave' is sketched in Figure 20. At each successive level in the hierarchy, an affix (a dependent structure) combines with a root or stem (an autonomous structure) to form a higher-order stem or word (also autonomous). Observe that at each level the autonomous semantic structure is symbolized by the autonomous phonological structure, and the dependent semantic structure by the dependent phonological structure—this kind of "harmony" between the two poles is natural and is probably to be expected as a general tendency. Together with the fact that the dependent semantic structure is in each case the profile determinant (also the most natural alignment), this parallelism between the semantic and phonological poles is what accounts for the correlation between semantic scope and morphological layering. Each successive

morphological increment, working from the root outwards, symbolizes the addition of a semantic predication which—being the profile determinant—imposes its own organization on the composite structure so derived.

We turn now to the specifics of how nee-vičuni-q is put together at the semantic pole. The valence relations are close to being canonical—the major departure from the canon is that the e-site within the dependent predicate is in each case a relation (more specifically, a process) rather than a thing. At the first level, [WANT] combines with [LEAVE], as seen in Figure 21 (cf. Figure 3).

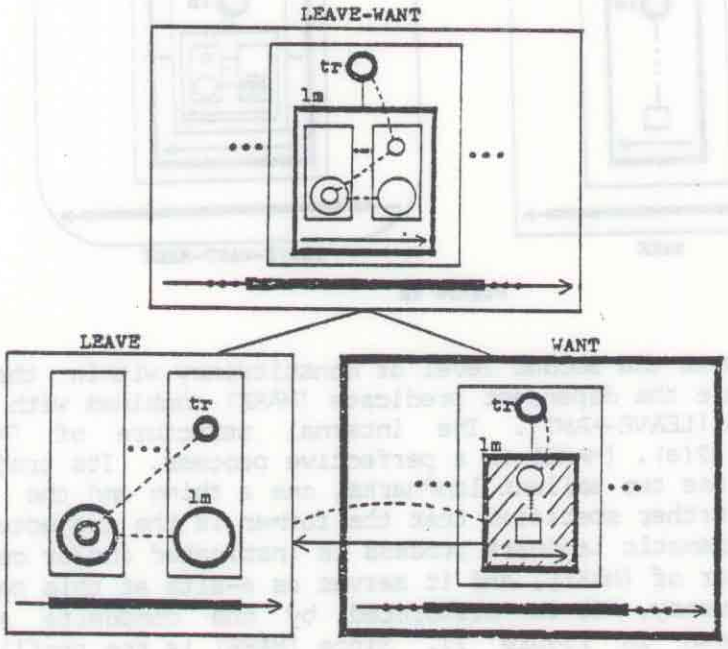

Figure 21

[LEAVE] was sketched earlier (Figure 6) and is given here with only minor notational adjustments. [LEAVE] is a perfective process, one involving the change of a situation through time. [WANT], by contrast, is an imperfective process, one which traces the continuation through time of a stable, unchanging situation. All of its component states are therefore identical, and it is sufficient to show one of them diagrammatically.

Since I presently have no principled way of depicting the specific nature of wanting, I have used for [WANT] the abbreviatory conventions of Figure 17. What is most important for our purposes is that [WANT] predicates a relation between a trajector, characterized only as a thing capable of desires, and a process functioning as landmark, i.e. the object of desire. It is an inherent property of this predicate in Luiseño, shown by a line of correspondence, that the trajector of [WANT] is identical to the trajector of its landmark process. This landmark process is specified only schematically within [WANT] itself, and it

serves as e-site for the valence relation, being elaborated by the more specific process [LEAVE]. Since [WANT] is the profile determinant, the composite structure [LEAVE-WANT] designates an imperfective process that can be described as the continuation through time of a relation between a thing and a conceived process involving this thing as trajector, namely a process wherein the trajector goes from an "in" relation with respect to some unspecified bounded area to an "out" relation.[10]

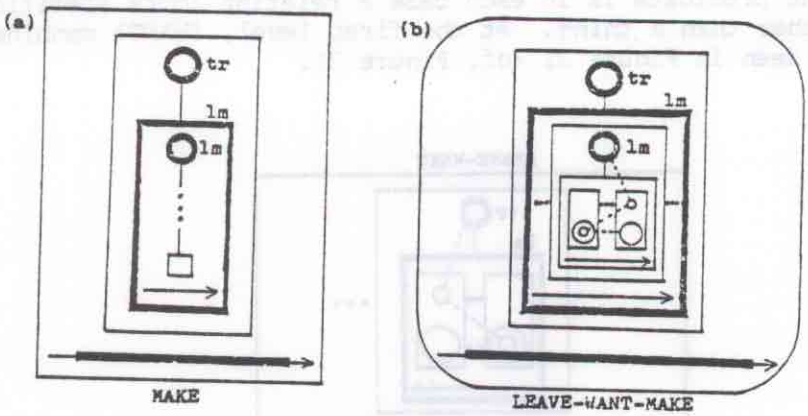

Figure 22

We turn now to the second level of constituency within the verbal expression, where the dependent predicate [MAKE] combines with the composite structure [LEAVE-WANT]. The internal structure of [MAKE] is given in Figure 22(a). [MAKE] is a perfective process. Its trajector is a thing, but it has two salient landmarks, one a thing and the other a process; it is further specified that the former is the trajector of the latter.[11] The schematic landmark process is instigated and/or controlled by the trajector of [MAKE], and it serves as e-site at this particular level of constituency. It is elaborated by the composite structure [LEAVE-WANT] shown in Figure 21. Since [MAKE] is the profile determinant, the (presumably novel) higher-order composite structure (LEAVE-WANT-MAKE) inherits its profile as a perfective process, shown in 22(b). 22(b) is obtained simply by replacing the schematic landmark process of 22(a) with the more highly specified processual structure [LEAVE-WANT] from 21.

I will ignore the tense predication except to observe that it leaves the processual profile of 22(b) unaffected.[12] The composite structure of the verbal expression nee-vič̆u-ni-q 'make(s) want to leave' is thus the same as 22(b), with an additional specification locating the temporal profile of this process relative to the time of speaking.

This brings us to the higher levels of constituency, where the nominals noo 'I' and poy 'him' combine with the verbal structure. These are exactly parallel to the canonical valence relations treated previously for the Hopi example (cf. Figures 11 and 12). It will be observed that Figure 22 has two things in its profile, one the trajector and the other a landmark, both specified only schematically. We can assume that

poy 'him' elaborates the landmark at one level of constituency, and that noo 'I' elaborates the trajector at the highest level.

The constituency in Figure 19 accords well with the overt form of (7), since noo and poy are separate words, the latter closer to the complex verbal expression nee-vicu-ni-q, which is treated as both a semantic and a phonological constituent in the present framework. This contrasts with the generative semantic or predicate-argument conception, where the phonological constituency (or surface structure) is at odds with the underlying semantic structure (cf. Figures 1 and 2). This discordance between semantic structure and overt constituency is necessary in these other models in order to account for the fact that 'I' is the semantic subject of 'make', though it does not form a phonological constituent with it, and 'he/him' the semantic subject of 'want' and 'leave', though it forms a phonological constituent with neither. This discrepancy is handled by the syntactic rule of Predicate Raising (possibly also Subject Raising) in the generative semantic model, and presumably by some comparable device in a predicate-argument model.

In the space grammar account there is no discordance between the semantic and the phonological constituency, and no underlying structures or special rules are needed to account for the semantic relations. The semantic relations are an automatic consequence of correspondences, both those internal to predicates and those between substructures of the semantic components in grammatical valence relations. In Figure 22(b), for instance, the thing functioning as the profiled landmark of (LEAVE-WANT-MAKE) is also indicated to be the trajector of the component [LEAVE-WANT] as well as [LEAVE]—each role pertains to a different level of constituency, but it carries over from one level to the next as more and more complex composite structures are formed by superimposing corresponding entities. A particular schematic entity can therefore be elaborated at alternate levels of constituency, with no effect on the semantic relations it bears at other levels. In the case at hand, poy is introduced at a rather high level of constituency, but the schematic landmark object it elaborates corresponds to the trajector of [LEAVE] and of [LEAVE-WANT] at lower levels. Similarly, noo elaborates, at the highest level, an entity introduced by [MAKE] at the second lowest level.

Contrary to the generative semantic view, then, grammatical constituency is not a direct reflection of semantic structure. Constituency reflects only the order in which simpler conceptions combine to form more complex ones—the semantic structure of an expression is given not by the constituency tree per se, but rather by the internal organization of the composite structure at each level. Because the same valence potential, involving the same entity as e-site, can be exploited at different levels of constituency, different constituency trees (i.e. different orders of amalgamation) can often lead to the same overall composite structure. This is why the conventions of a language often permit alternate word orders or phonological phrasings for otherwise equivalent expressions. Correspondences are essential to grammatical valence relations, but constituent structure is to some degree incidental and variable.

Footnotes

[1] Langacker 1978, 1979a, and 1979b present an earlier version of this framework, one which used predicate-argument structure of the sort illustrated in Figure 2. Langacker 1980a and 1980b are general introductions to the model as it presently stands.

[2] I will ignore the accusative inflection on moosa 'cat', as well as tense/aspect.

[3] This is the same device already used internally to the predicate [FIND] in Figure 3—the dotted lines in 8 indicate that the trajector is identical for all component states of the process, as is the landmark.

[4] This is no doubt related to the special status of the trajector as the figure within the relational profile. The reasons for believing that the landmark (object) is normally more closely bound to the verb than is the trajector (subject) are well known. They include word order tendencies, the prevalence of object-incorporation as opposed to subject-incorporation, the common occurrence of object-verb idioms in contrast to the rarity of subject-verb idioms, and so on.

I use rectangles and square brackets to enclose structures that probably represent fully mastered units for a typical speaker; ellipses and parentheses enclose structures that may well be novel. While all of the individual predicates in Figure 11 are obviously established units, the composite structures (FIND-CAT) and (FIND-CAT-MAN) possibly are not.

[5] The data and analysis are from Eugene Casad.

[6] This data is taken from Seiler 1977 (p.300f).

[7] [MY] itself is internally complex, but I will ignore that here. Cf. Langacker 1980a.

[8] It is not unlikely that ne-wes-'a navet can also designate a cactus that the speaker owns even if it has been planted by someone else. This variant of the construction would simply lack these latter two correspondences, and the neighborhood within [MY] would be one of ownership, as with ne-'aš kiyul.

[9] See Langacker 1978 and 1979b for extensive discussion of this aspectual distinction and its implications for grammatical structure.

[10] No rule analogous to Equi NP Deletion is needed in space grammar. Lines of correspondence within and between predicates establish that the trajector (subject) of [WANT] is identical to that of [LEAVE]; this is explicit in the composite structure and requires no special provisions.

[11] Notions like trajector and landmark must be understood relative to a particular level of organization. Thus, the thing labeled lm in 22(a) is simultaneously a landmark and a trajector. It is the trajector relative to the process serving as the landmark of [MAKE], but it is a landmark relative to [MAKE] as a whole.

This kind of processual predicate, with two landmarks, one functioning as the trajector of the other, is quite common. Consider [THROW], as in Bill threw the satchel to his sister. [THROW] relates two objects, elaborated here by Bill and the satchel, and also makes salient internal reference to a spatial path, namely the trajectory followed by the landmark object, the thing thrown. This path is itself a landmark, a salient entity within [THROW] which can be elaborated by a relational predication such as to his sister. Observe that the satchel is both the landmark of [THROW] and the trajector of the path specification.

[12]That is, [TNS] locates the process temporally but does not otherwise affect it. (-q is a neutral tense marker, normally translated as present or recent past.) It is an epistemic predicate and consequently has special properties regularly associated with such predicates (cf. Langacker 1979a and 1980b for further discussion).

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