

THE BASIC ELEMENTS OF ARGUMENT STRUCTURE

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0. Introduction.

The term “argument structure” is used here to refer to the syntactic configuration projected by a lexical item. It is the system of structural relations holding between heads (nuclei) and arguments linked to them in the roster of syntactic properties listed for individual items in the lexicon. While a lexical entry is much more than this, of course, argument structure in the sense intended here is precisely this and nothing more.

There is much that a grammar of English must say about verbal expressions of the simple type represented in (1), for example:

- (1) (a) make trouble
- (b) bake a cake
- (c) have puppies
- (d) build a house

Among other things, these particular verb-complement constructions have a certain semantics associated with them—informally, they involve “creation” or “production” (cf., Levin, 1993, for much discussion of verb classes). And their subject, an external argument, is “agentive” in the generally understood sense, and in perfect conformity to the widely accepted hierarchy of thematic roles (Jackendoff, 1972; Grimshaw, 1990). The complement (*trouble, a cake, etc.*) is a full DP in these examples and it functions as the grammatical object in the basic sentential syntactic use of such verb phrases. Depending on certain choices made in the actual form of the complement (e.g., in such categories as number, definiteness, etc.), that argument can affect the aspectual interpretation of the verb phrase in various ways which are now quite well understood (Dowty, 1979; Vendler, 1967; Tenny, 1994). And the semantics of VPs headed by verbs of creation or production are such that, in the typical or normal interpretation, the entity referred to by the complement DP does not exist prior to completion of the event denoted by the verb phrase—or, more exactly, it does not exist in the same form before and after completion of the event. A house in blueprint is properly a house even before it is built, but it nonetheless “comes into existence” as a different sort of thing when built. This has linguistic consequences which are partially syntactic in character, among them a significant restriction on the interpretation and use of depictive secondary predication of the type represented in *eat the fish raw*, in which the secondary predicate is associated with (i.e., predicated of) the complement. Thus, the secondary predicates in *buy the house new* and *buy the house cheap* are true depictives, while those of *build the house new* and *build the house cheap* are either impossible or of a different character.¹

¹In *build the house cheap/new*, there is for us an interpretation (somewhat strained) akin to the resultative interpretation associated with the adjective in *pound the metal flat* (Levin and

The semantic issues touched on in the preceding paragraph are separate from argument structure in the narrow sense adopted here. At least, we take them to be separate issues, although the research program is never absolutely clear given the inescapable fact that the elements and components of language interact in a manner sufficiently complex to obscure the divisions and separations among them. For grammarians who believe in these separations, there is, of course, the constant danger of improper inclusion and exclusion. Consequently, the manner in which we restrict the domain of argument structure may well err in excluding from it the issue of the thematic (theta-role) interpretations attributed to specific arguments, for example; or in excluding the aspectual properties associated with actual verb phrases; or in some other exclusion. If so, we are simply mistaken in the individual instances; but we continue to believe that the position which defines argument structure as narrowly as possible is correct, on explanatory grounds, as we will try to show. In any event, we must say emphatically that semantic issues like those briefly mentioned above, and others as well, are not in fact excluded from our general linguistic concerns. It will be necessary ultimately to show precisely how they interact with argument structure and how they are properly separate from it (for an idea of the range of semantic detail involved in a full account of the lexicon, see Jackendoff, 1983, 1990; Pustejovsky, 1995; and Tenny, 1994).

Once defined in the manner suggested, argument structure can be seen to have a rather surprising property. The verbs of natural languages, generally the “richest” category in this regard, are extremely limited in the variety and complexity of argument structures they display, and these conform to a highly restricted typology. Few verbs have more than three arguments, and the range of generally recognized thematic (or semantic) roles associated with verbal arguments is rather small, numbering half a dozen or so. This impoverishment is in striking contrast to the syntactic structures of sentences, whose complexity is essentially without limit. It is a proper purpose of linguistic research to explain this fact, assuming that it is indeed a true fact of natural languages.

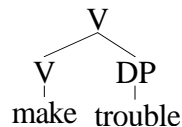
Our purpose in this work is to explore the notion that the constrained nature of argument structure follows from the nature of the basic elements. We take these to be heads and arguments (belonging to specific lexical categories: V, N, etc.), and just two structural relations, complement and specifier.

Rappaport Hovav, 1995:33-78), cf. *build the house tall(er)*. There is also an adverbial interpretation (perhaps non-standard), particularly for *cheap* (i.e., *cheaply*). But we are not able to assign the depictive reading (typically stage-level) straightforwardly here. Interestingly, thinking of the house in its blueprint form does not help, here at least. However, a depictive reading begins to emerge when one considers the nomic or generic *build houses cheap*, where it is possible to understand the phrase as meaning something like *build houses when they are cheap*. The point remains, however. Depictive secondary predication of the complement in VPs of creation and production is not straightforward. Verbs of birthing are different in this regard, of course. Thus, (*mammals*) *bear their young alive* is perfectly natural.

1. Argument structure types.

The verbal projections of (1) represent a good place to start the study of argument structures. The verbs which head these projections share a certain property, characteristic of the argument structure type which they represent—namely, the property that they take a complement (the object DP of the examples cited) and the structure they project does not include a specifier. We will refer to argument structures having this characteristic as “lp-monadic”. That is to say, the lexical projection (“lp”)—i.e., the argument structure configuration projected by the head—contains just one argument, i.e., the complement. The complement relation is defined as the unique sister to the head, as exemplified by the DP *trouble* in the configuration depicted in (2) below (where head, projection, domination, and sisterhood, not linear order, are the relevant structural features):

(2)



In sentential syntax, of course, these verbs are ordinarily thought of as dyadic, since they have both a subject and an object.² We use the terms monadic, dyadic, etc., not in relation to sentential syntactic adicity but strictly in relation to the arguments (complements or specifiers, irrespective of morphosyntactic category) which must appear internal to the lexical configuration associated with a lexical item. For lexical items of the type represented in (1), the sentential syntactic subject (e.g., *the cowboys* in *the cowboys made trouble*) is an external argument, we claim, and therefore not an argument (specifier or complement) internal to the lexically projected configuration.³

²The term “sentential syntax” is used here to refer to the syntactic structure assigned to a phrase or sentence involving both the lexical item and its arguments and also its “extended projection” (cf., Grimshaw, 1991) and including, therefore, the full range of functional categories and projections implicated in the formation of a sentence interpretable at PF and LF. The internal structure of a lexical projection is also properly speaking a “syntax”, but it is the structure included within the projection of the lexical head and is defined strictly in terms of heads and arguments.

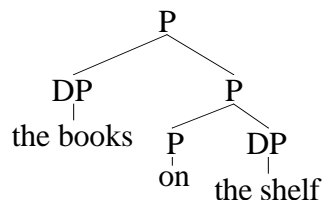
³The appearance of a sentential syntactic subject with predicates like those in (1) is forced by a general principle of grammar (cf., Chomsky, 1982; Rothstein, 1983) which, following an established tradition within generative grammar, we will refer to as the Extended Projection Principle (EPP). Following Bittner (1994; and see also Hale and Bittner, 1996) we will assume that the subject (whether external or raised from an internal position) enters into a “small clause” relation with the VP predicated of it (cf., Koopman and Sportiche, 1991)—it is structurally an adjunct to the VP and, moreover, a “distinguished adjunct” coindexed with the VP, a formal notation corresponding to predication (cf., Williams, 1980). In this view of the matter, an external subject, being an adjunct to VP, is in a minimal sense “internal” to VP, as in the “VP-internal Subject Hypothesis”, but it is not internal to the lexical configuration projected by a lexical head, since it occupies neither a complement position nor a specifier position within that projection.

In this latter respect, the situation represented by the argument structure type attributed to the verbs of (1) can be contrasted with the configurations projected by the prepositions in (3):

- (3) (a) (put) the books on the shelf
 (b) (get) the cows into the corral
 (c) (pound) nails into the wall
 (d) (drip) paint on the floor

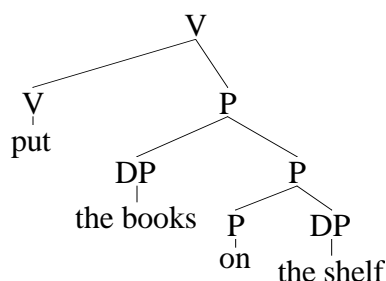
We are concerned here just with the structure following the parenthetical verb (itself irrelevant to the immediate issue). In each case, the relevant structure is headed by a preposition (e.g., *on*, *into*), and the structure illustrates fully the essential lexical character of heads of the type normally realized by prepositions in English. These elements have the property that they take both a complement (a DP in the present examples, *the shelf*, *the corral*, etc.) and a specifier (also a DP in these examples, *the books*, *the cows*, etc.). As usual, the complement is the unique sister of the head. The specifier is the unique sister of the initial projection of the head, i.e., the substructure formed by the head and the complement. This arrangement is “lp-dyadic”—that is to say, it is the structural configuration defined by a head which projects two internal argument positions, in accordance with its elemental lexical properties. The lp-dyadic structure projected by the preposition in (3a) is presented diagrammatically in (4):

(4)



The presence of a specifier argument, of course, is the essential structural difference between the dyadic lexical configuration of (4) and the monadic configuration of (2). While the verbs of (1), sharing the structure of (2), have a subject and are in that sense also dyadic, the subject is an external argument, not a specifier in the lexical configuration. The evidence for this lexical difference is straightforward. The structure depicted in (4) can—in its entirety, specifier and all—appear as the complement of a verbal head within a lexical projection. This is the enabling condition for an indefinite number of transitive verbs of “placement” or “location”, like *put* (*the books on the shelf*), and others (cf., (3) above):

(5)



The argument structure of the lexical item *put* is a complex configuration consisting of a P-projection (dyadic), embedded as the complement within a V-projection (itself monadic). The specifier within the embedded P-projection will, in the normal course of events, appear as the grammatical object of the verb in sentential syntax (i.e., it will be assigned structural case, accusative, in the active voice and, in the passive, it will be forced to raise into the specifier position of an appropriate functional category).

Crucially, the specifier of the embedded P in (5), and the corresponding position in all such cases, is within the structural configuration associated with the lexical entry of the verb. It is properly an internal argument, lexically. This is not true of the subject argument of verbs like *make*, *bake*, etc., in (1). There are no lexical structures comparable to (5) in which the subject of *make*, *bake*, etc., occupies a lexically internal position comparable to that occupied by the specifier *the books* in (5).⁴ This follows from the fact that the subjects of the verbs in (1) are external arguments.

We take it to be an inherent and fundamental property of canonical prepositions that they project a structure containing both a complement and a specifier. Prepositions are prototypically “birelational”; they specify a relation (spatial, temporal, or other) between two entities (or two events, circumstances, etc.). And the syntax of argument structure—permitting both complements and specifiers—defines an entirely local structure corresponding to the birelational character of prepositions. It is at least intuitively appealing to think of the structure of a prepositional projection as involving a kind of predication. According to this conception of the structure, the head (P) and its complement (a DP in the examples so far considered) combine to form a predicate. By definition, a predicate requires a “subject”, which is supplied by the specifier. Thus, the

⁴This is a claim, of course, and it could be false. The force of the claim will become more evident as the discussion proceeds. For now we note that obvious apparent counterexamples, like the causative construction exemplified by *make John bake a cake*, are sentential syntactic constructions in which the object of the causative verb *make* is an extended projection of the verbal head, despite its traditional designation as a “bare infinitive”—cf., the passive, in which the *to* of the infinitive surfaces, and the negative, as in *make John not bake a cake, not raise cane, not whistle a tune*. Thus while the causative verb *make* is a lexical entry (lp-monadic), the causative construction is not. The internal composition of the clausal complement of causal *make* is entirely free. It is not “listed” in the lexicon. Moreover it is an extended projection, not a bare V-projection, and therefore includes functional categories, however reduced or impoverished.

appearance of a specifier, as well as the appearance of a complement, is an inescapable consequence of the nature of the head. Given that it is the head which fully determines the dyadic structure in these cases, we will refer to them as “basic (lp-)dyadic”.

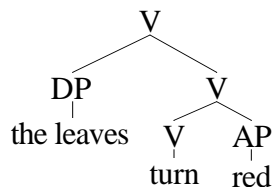
There is another argument structure type whose character compels us to attribute to it an internal specifier argument. It differs from the type represented by (5) in certain respects, however. Consider the following sentence pairs.

- (6) (a) The leaves turned red.
The cold turned the leaves red.
- (b) The coconut split open.
The blow split the coconut open.
- (c) The liquid froze solid.
We froze the liquid solid.
- (d) The safe blew open.
The charge blew the safe open.

Like the prepositions exemplified in (3), the verbal heads in the sentences of (6) take both a complement (an adjective in these cases, *red*, *open*, *solid*) and a specifier (a DP, *the leaves*, *the coconut*, etc.). We can see that the specifier is, in our sense, internal to the lexical projection, because it appears as the sentential syntactic object in the transitive alternant (the second of each pair). The transitive, we claim, is formed by embedding the intransitive lexical structure (lp-dyadic) in the complement position of the lp-monadic structure.

The intransitive verbal projections of (6) have the following form:

(7)



As in the prepositional constructions, the head (V) forms with its complement (AP) a substructure which demands a specifier (in the manner of a predicate requiring a subject). Here, however, it is the complement, not the verbal head itself, which has the fundamental property of requiring the projection of a specifier. It is an essential characteristic of adjectives (in languages that have them as a distinguished category) that they must be attributed of something, regardless of the structure in which they appear. In verbal constructions like (7), this property is satisfied by the specifier (i.e., a “subject” of sorts)—the verbal head serves to supply a structure in which an appropriately positioned specifier can appear.

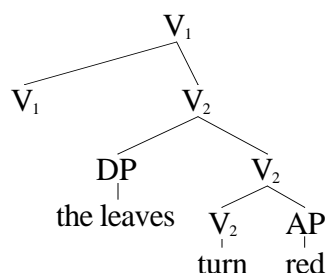
It is fitting to view argument structures of the type represented by (7) as “composite”. They are, in fact, made up of two monadic structures, one being the type already discussed, i.e., a head which takes a complement, and the other being the structural configuration inherent to the category to which English adjectives belong, i.e., heads which do not take a complement but must appear in construction with a specifier. The combined structure satisfies the requirements of the two lexical nuclei—the adjective satisfies the complement requirement of the verb, and the latter supplies a place for the specifier required by the adjective. The adjectival phrase is, so to speak, parasitic on the verbal projection. But the reverse is true as well, for the verbal head projects a specifier position solely by virtue of its appearance in composition with a complement that itself requires an argument in a local specifier position.⁵

For obvious reasons, we will refer to dyadic structures of the type represented by (7) as “composite (lp-)dyadic” whenever it is necessary to distinguish the two dyadic types.

The intransitive members of the pairs in (6) are lexically based on composite dyadic configurations like (7). As actual sentences, of course, they appear in construction with specific functional projections required in sentential syntax—e.g., tense, complementizer. The same holds, of course, for phrasal arguments in syntax. The DP occupying specifier position in (7) is a nominal construction licensed in part by the determiner (D) projection which dominates it. But this is not enough to license a “fully projected argument phrase” in sentential syntax. It must at least satisfy the further requirement of Case. Accordingly, in English at least, it must raise out of the specifier position and into a position where nominative case can be assigned (e.g., the specifier position of an inflectional category, such as tense). Our concern here is lexical, however, and we are therefore concerned primarily with what we take to be the *basic* position of an argument, in this case the specifier of (7). While the DP occupying that position comes ultimately to function as subject in the sentential syntax of the intransitive sentences of (6), it functions as sentential syntactic object in the transitive members of (6). This is fully consistent with the claim that the argument shared by both transitive and intransitive alternants is a specifier internal to the lexical argument structure. We take the transitive alternant to have the following form:

⁵The verb does not, in and of itself, motivate the appearance of a specifier. In fact, we suspect that this is quite generally true of verbs in English—i.e., verbs typically project the monadic structure including just a complement. It is not surprising, therefore, that *turn* does not project a specifier (capable of appearing as a sentential syntactic object) in all instances, and particularly when its lexical complement is nominal, as in *turn the corner* (cf., **turn the car the corner*).

(8)



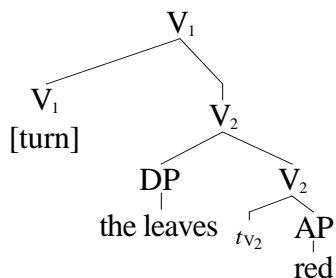
Here V_1 is a monadic nucleus taking V_2 as its complement. The latter is the dyadic structure just discussed. There is, of course, just one overt verb in the actual sentences of (6). This is also true in (8), of course. However, in (8) we are imputing to the transitive *turn*, and to other transitives of its type, an argument structure configuration which is essentially isomorphic to that of the location verb *put*, as in (5) above, the difference being that the upper head, V_1 , is an empty head in (8), unlike the overt *put* of (5). The parallel is important, however, since the transitive verb *turn* and the transitive location verb *put* come to share a fundamental structural property in sentential syntax. Specifically, the internal specifier DP is in a position in which it can, and must, receive case; it is governed and locally c-commanded by a verbal head.

In order to realize fully the parallel between *put the books on the shelf* and *turn the leaves red*, we must contrive to get the verb *turn* into the syntactic position it actually occupies in the transitive predicate. This brings us, in fact, to a topic which will figure prominently in our discussions henceforth, namely “conflation” or “incorporation”.⁶

We have adopted here the hypothesis that the upper verbal head in (8) is empty. In fact, given our general proposal, this must be the case, since the configuration involved here is built upon the intransitive substructure headed by *turn*, the sole overt verbal head. The upper head, a member of the monadic class of heads, is not separately realized phonologically. Let us say—perhaps only informally, but nonetheless conveniently for our expository purposes—that the upper head, V_1 , has an empty phonological matrix. And let us assume further, as a general principle, that an empty phonological matrix must be eliminated from the morphosyntactic representation of sentences. This is accomplished, we assume, through conflation. Conflation is a specific kind of incorporation, conforming to an especially strict version of the Head Movement Constraint (Travis, 1984; Baker, 1988), according to which the phonological matrix of a complement replaces the empty matrix of the governing head. By “phonological matrix of a complement”, of course, we mean the “phonological matrix of the head of a complement”. Thus, the observed structure of (8), i.e., the “surface form of the verb”, that form presented to sentential syntax, so to speak, is as depicted in (9):

⁶We borrow the term “conflation” from Talmy (1985), extending it here to a range of phenomena somewhat different from that covered by his use of the expression.

(9)



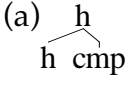
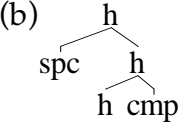
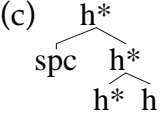
We will, in general, use the term “conflation” rather than “incorporation” in reference to the process involved here, in order to distinguish it from incorporation in the sense of Baker (1988), noting, of course, that the two notions are closely related and may ultimately prove to be the same thing. For present purposes, however, conflation is restricted to the process according to which the phonological matrix of the head of a complement C is introduced into the empty phonological matrix of the head which selects (and is accordingly sister to) C. This is the circumstance represented in (9), where the matrix “[turn]” is transferred from the lower head to the upper head—leaving, we suppose, a trace of as yet unknown character, perhaps simply a copy of V_2 .⁷

Conflation, in the sense we have defined it here, is a major process in English morphology, accounting for an impressive range of forms available through so-called “zero derivation”, including denominal verbs (like *dance*, *laugh*, *box*, *saddle*, and the like) and de-adjectival verbs (like *clear*, *narrow*, *thin*, etc.). Conflation also accounts for certain derived words in which overt morphology appears (as in *red*, *widen*, *enliven*, and so forth). The topic of zero derivations and conflation will occupy much of our discussion, but before embarking on that topic, we would like first to review the elementary structural types which are defined by the fundamental relations in argument structure, i.e., the relations head-complement, and specifier-head. We take these to be maximally restrictive, in accordance with the informal definitions set out in (10):

⁷We indicate here only the purely morphophonological effects of conflation. We assume that the syntactic effect is head-adjunction, inasmuch as conflation is a variant of Head Movement (though subject to the more restrictive constraint that it is limited in effect to incorporation from the complement position; cf., Travis, 1984).

- (10) The fundamental relations of argument structure:
- (a) Head-Complement. If X is the *complement* of a head H , then X is the unique sister of H (X and H mutually c-command one another).
 - (b) Specifier-Head. If X is the *specifier* of a head H , and if P_1 is the first projection of H (i.e., H' , necessarily non-vacuous), then X is the unique sister of P_1 .

The relations defined in (10) straightforwardly permit certain lexical structures. A head which takes a complement but no specifier projects the structure which we have termed monadic, corresponding to (11a) below (in which “h” represents the head, and its categorial projections, and “cmp” represents the complement; cf. (2) above). The definitions also permit a structural type consisting of the head alone, i.e., a head whose essential property is that it takes no complement and projects no specifier, corresponding to (11d) below, the “atomic” and simplest type. And the definitions also permit a basic dyadic type in which the head projects a structure embodying both the head-complement relation and the specifier-head relation, as in (11b), in which “spc” represents the specifier. The logic of the definitions also permits there to be a type of head which requires a specifier but excludes a complement. This can be accomplished only by composition. The head that has this property must itself appear as the complement of another head, “h*”, as in (c), in which “h” can be seen as endowing “h*” with the ability to project a specifier.⁸

- (11) The Structural Types of Lexical Argument Structure:
- (a) 
 - (b) 
 - (c) 
 - (d) h

The structural configurations set out in (11) are neutral with respect to the morphosyntactic category (i.e., V, N, etc.) of the head. We think that it is right to keep these things separate. While there is, in English, a favored categorial realization of these heads, it does not hold cross-linguistically, and it does not hold universally in any one language, including English. In English, the predominant realizations are as follows: (a) V; (b) P; (c) A; (d) N. However, while (a) and (d) are relatively stable in category, (b) and (c) are less so, being realized often as V. In some languages of course, the category A is not distinguished—in Navajo, for example, the (c)-type configuration is headed by V universally; and in Warlpiri, of Central Australia, it is realized as N. The category V is a popular categorial realization of the (b) type; and in some languages, N realizes this type. We are aware that there is regularity here, and that there are generalizations to be made. Nevertheless, we will assume that morphosyntactic category and structural type are independent variables in the grammar of lexical projections.

⁸The head designated h in (c) may represent a simple head, without further projection, or it may represent a full phrase, since this is complement, and thus occupies an argument position within the larger structure headed by h*.

We turn now to a consideration of lexical items which involve the process of “conflation”, producing “synthetic” forms of the type represented by English transitive *turn*, as in (9) above, and various denominal verbs, such as, *calve*, *sneeze*, *shelve*, *bottle*, *saddle*, and *blindfold*.

2. Synthetic verbs.

An unusually large number of English verbs give the appearance of being related to nouns—e.g., each of *dance*, *laugh*, *bottle*, and *saddle* is both a noun and a verb, and *shelve*, *sheathe*, *sheave*, *enslave* and *imprison* are verbs which are clearly related to nouns, in one way or another. Verbs of this sort are quite generally held to be “denominal”—they are “verbs derived from nouns”.

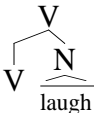
Let us consider first the denominal verbs belonging to the class represented by (12):

- (12) belch, burp, cough, crawl, cry, dance, gallup, gleam, glitter, glow, hop, jump, laugh, leap, limp, nap, run, scream, shout, sleep, skip, sneeze, sob, somersault, sparkle, speak, stagger, sweat, talk, trot, twinkle, walk, yell.

These verbs share an important lexical and syntactic property with analytic verbal expressions like “make trouble” and “raise Cain”—they do not enter into the transitivity alternation which characterizes verbs like *turn*, *split*, etc., exemplified in (6) above, thus:

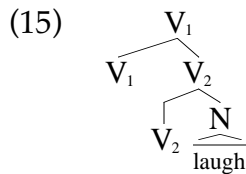
- (13) (a) The cowboys made trouble.
 *The beer made the cowboys trouble.
 (i.e., the cowboys made trouble because of the beer)
- (b) The children laughed.
 *The clown laughed the children.
 (i.e., the children laughed because of the clown)

We account for this shared property, as well as the denominal character of the verbs of (12), by assigning them the monadic structure (14), representing the lexical structure of *laugh*:

- (14) 

The impossibility of *laugh the child*, *cough the colt*, *cry the baby*, *sleep the dog*, in the sense of *make the child laugh*, *make the colt cough*, and so on, follows from the fact that the lexical head of each of these verbs, and of the of (12) generally, belongs to the monadic type (11a), exemplified by (14). This configuration lacks a specifier and, therefore, cannot transitive in the *simple* manner.

Simple transitivity of a verb involves its insertion into the complement position of a matrix verb, e.g., a verb of type (11a). This is a “free” option within the present conception of argument structure; in fact, this cannot be avoided. Suppose, then, that (14) is embedded as a complement in another verb of type (11a), giving the following:



Whether a verb of this structure actually exists or not, or whether it *could* exist, is an issue that must eventually be addressed. But putting this question aside, it is clear that (15) cannot give rise to the transitive verb of **the clown laughed the children*. And this is a good thing, of course, since such a verb is impossible. This follows straightforwardly from the fact that the verbal head of the lexical structure of *laugh* projects no specifier, nor does its complement (the noun *laugh*) belong to the type of elements whose members force the appearance of a specifier in the projection of the host verb. Hence, there is no place in the lexical structure for the surface object *the children* in the hypothetical transitive clause **the clown laughed the children*. These observations apply generally to the verbs of (12) and to the class of verbs known as “unergatives”.

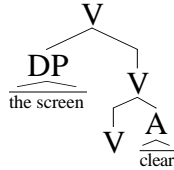
By contrast, insertion of the composite dyadic ((c)-type) configuration (7) into a monadic ((a)-type) structure, giving (8), yields an acceptable transitive structure. The specifier of the dyadic complement *the leaves turn green* functions as object in the derived verbal construction. This is simple, and successful, transitivity, a free option in this framework. And this option accounts as well for the large number of “fully synthetic” (often, but not exclusively, de-adjectival) verbs of English, including those listed in (16), which exhibit the familiar transitivity alternation exemplified in (17):

- (16) thin, narrow, cool, thicken, harden, soften, widen, lengthen, shorten, broaden, loosen, tighten, darken, redden, deepen, lower, enlarge, shrink, grow, break, split, crack, sink, melt, freeze.

- (17) (a) The screen cleared.
 (b) I cleared the screen.

The lexical item *clear*, has the dual properties of the (c)-type head—it requires a specifier and does not take a complement. Consequently, it must appear in the composite dyadic structure, like *green* of *turn green*. It appears, therefore, as the complement of a host which projects the required specifier. Here, however, the host—unlike *turn* of *turn green*—is a phonologically empty verb, as depicted in (18), the idealized abstract structure corresponding to (17a):

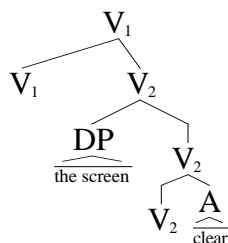
(18)



The actual verb, as seen in (17a), is derived by conflation, which introduces the phonological matrix of the adjective into the empty matrix of the verb. The verbs of (16) are of the same general type, and are derived in the same way, although many of the de-adjectival members of the type involve phonologically overt morphology associated with the derived verb. We assume that the host verb in these cases is bipartite, consisting of an empty phonological matrix together with a following overt matrix. The empty matrix is given phonological substance (and thereby eliminated) through conflation, resulting here in a derived verb made up of an adjectival root followed by a suffix, as in *short-en*, *thick-en*. Among the languages of the world, this pattern, according to which the derivation of verbs is signaled morphologically, is probably more common than zero derivation of the type represented by English *clear*. The fundamental process is the same, however.

The structure depicted in (18) corresponds, of course, to the intransitive variant of *clear*. In sentential syntax, the argument occupying its specifier will be licensed in one way or another, in the simplest case by raising to an appropriate functional category where, as subject, it will satisfy the EPP, a sentential syntactic condition. Transitivity, as noted, is a free and inescapable possibility, given by virtue of the fact that a verbal projection may appear as complement in the (a)-type argument structure configuration, as in (19):

(19)



Transitivization is successful here, since *clear* heads a dyadic, (c)-type, structure and, accordingly, presents a specifier, corresponding to the object of the derived verb. The derived verb itself is the result of conflation, first of A with V_2 , and then of V_2 with V_1 , and its derived position ensures that it will assign case to the DP which it locally c-commands (i.e., the specifier of its complement), in accordance with the principles of case assignment which hold in English and other accusative languages.

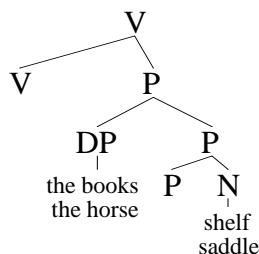
As an aside, we should mention that representations like (18) and (19) do not exist at any stage in the syntactic representations of sentences. Rather, they are used here simply to register the properties of the heads which comprise the lexical item involved (e.g., the specifier requirement of *clear*, the complement requirement of V_2 and the complement requirement of V_1). The actual derivation of argument structure configurations, like the derivation of syntactic structures generally, proceeds according to the principles of Bare Phrase Structure (Chomsky, 1995). We take conflation to be a concomitant of Merge. Thus, when (phonologically null) V and the adjective *clear* are merged to form the derived verbal projection [V V A], conflation “happens immediately”. That is to say, in addition to the standard head complement configuration which results from Merge, we assume that it is a property of heads which are phonologically empty, whether wholly or partially, that they attract the phonological matrix of their complements, conflating with them. This has certain consequences for the theory of argument structure, as we shall see presently.

Conflation is also involved in the derivation of English “location” (20a) and “locatum” verbs (20a and 20b, respectively; cf., Clark and Clark, 1979):

- (20) (a) bag, bank, bottle, box, cage, can, corral, crate, floor (opponent), garage, jail, kennel, package, pasture, pen, photograph, pocket, pot, shelve, ship (the oars), shoulder, tree.
- (b) bandage, bar, bell, blindfold, bread, butter, clothe, curtain, dress, fund, gas, grease, harness, hook, house, ink, oil, paint, paper, powder, saddle, salt, seed, shoe, spice, water, word.

These verbs are synthetic counterparts of the verb *put*, whose argument structure is depicted in (5) above. Thus, they involve the dyadic (b)-type structure appearing as the complement of the (a)-type, as shown in (21):

(21)



Here again, we interpret the diagram in (21) as a depiction of the properties of the heads which make up the lexical item. The inner head, belonging to the category P, has the syntactic property that it takes a complement and projects a specifier (a DP, e.g., *the books*, *the horse*). It has, in addition, the morphological property that it is empty and therefore must conflate with its complement. The upper head, V, is also empty and thus necessarily conflates with its complement (that is to say, with the head of its complement) P, itself the product of conflation. These processes give phonological constituency to the verbal head in (21), as required, and as exemplified in the sentences of (22):

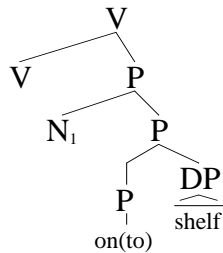
- (22) (a) I shelved the books.
(b) She saddled the horse.

The recognized and real distinction between location and locatum verbs is not one of structure, we maintain, but derives from the fundamental nature of the inner head, i.e., head of the dyadic (11b)-type structure upon which the verb is based. It is a characteristic of P, the default head of the basic dyadic lexical structure, that it distinguishes “terminal” and “central” coincidence. This is an opposition which is pervasive in grammar, in fact (cf., Hale, 1986, for a discussion of this in Warlpiri grammar). In (22a), exemplifying terminal coincidence, the incorporated, or conflated, nominal (*shelf*) represents an “end-point” of motion or transfer on the part of the entity denoted by the variable argument (*the books*); in (22b), on the other hand, the incorporated argument (*saddle*) corresponds to something which the entity denoted by the variable argument (*the horse*) comes temporarily or permanently to “have” or to “wear”, or to “be with”. This we associate with central coincidence. Accordingly, the expressions *harness the mule*, *shoe the horse* correspond to *fit the mule with a harness* and *fit the horse with shoes*, rather than to the paraphrases which come more quickly to mind, *put a harness on the mule* and *put shoes on the horse*.

Structures of the type represented by (22) raise a question in relation to the theory of argument structures. Suppose, for example, the inner head P in (22a) were not empty, but rather an overt preposition, say *on*, or *onto*, or *with*. English does not permit incorporation of a noun into these prepositions, nor does it permit incorporation of bare prepositions into an empty verb. These are local facts of English, not necessarily of languages generally. So no conflation will occur from the P or its complement. The latter cannot “skip” the preposition, of course, by virtue of the Head Movement Constraint. But suppose the specifier of

P were a simple noun, rather than a DP. Could that noun conflate with the verb? That is to say, could N₁ conflate with V in (23)?

(23)



By hypothesis, conflation of nouns into verbs is possible, straightforwardly giving unergatives like *laugh*, *sleep*, and so on, as we have seen. But conflation from a specifier would give rise to a class of “location” verbs like those exemplified in (24a,b) and “locatum” verbs like (24c,d):

- (24) (a) *He booked on the shelf.
 (Cf., He put books on the shelf / shelved books.)
 (b) *We appled in the box.
 (Cf., We put apples in the box / boxed apples.)
 (c) *They housed with a roof.
 (Cf., They fitted a house with a roof / roofed a house.)
 (d) *They water with poison.
 (Cf., They contaminate water with poison / poison water.)

These are, so far as we can tell, impossible in any language, a fact which follows, we believe, from the conception of conflation as a concomitant of Merge and a relation holding strictly between a head and its complement. In (23), for example, the Head-Complement relation holds between P and V. The former is (the head of) the complement of the latter. Accordingly, P can conflate with V—depending on language specific factors, to be sure (thus, in English, only with prior conflation of empty P and its N complement). By contrast, N₁, the specifier of P in (23), bears no relation whatsoever to V in lexical argument structure, where the only “visible” relations are specifier-head and head-complement.

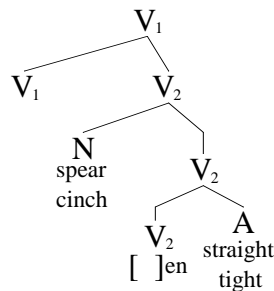
The same principle might also explain the impossibility of verbs of the type represented in the “serial” constructions of (25):

- (25) (a) *He speared straighten.
 (Cf., He straightened a spear. The spear straightened.)
 (b) *She cinched tighten.
 (Cf., She tightened the cinch. The cinch tightened.)

The starred sentences are derived by hypothetical conflation of the specifier of a composite lp-dyadic—i.e., (11c)-type—verb into the higher empty verb of the transitive alternate. That is to say, N of (26) conflates with V₁, an impossibility if

conflation is a relation, established at Merge, between a head and its complement:⁹

(26)



3. Some cross-linguistic observations.

It is well known that the simple transitivity alternation represented in English by verbs like *break*, *split*, and others (cf., (16) above) is common among languages of the world. And it is known that there is striking cross-linguistic agreement in semantics in the class of simple alternating verbs. Thus, it is relatively easy to assemble lists like the following, comparing English, the Misumalpan language Miskitu, and the Athabaskan language Navajo:

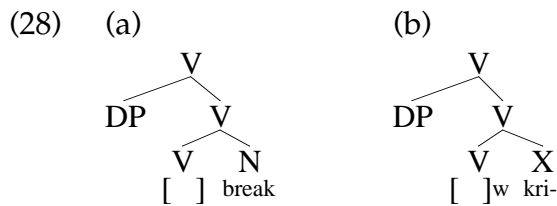
(27) Verbs which alternate:

English	Miskitu		Navajo	
	<i>intrans</i>	<i>trans</i>	<i>intrans</i>	<i>trans</i>
boil	pya-w-	pya-k-	-béézh,	-ł-béézh
break	kri-w-	kri-k-	ii-dlaad,	ii-ł-dlaad
crack	bai-w-	bai-k-	-ii-ts'itł,	-ii-ł-ts'itł
dry (up)	lâ-w-	lâ-k-	-gan,	-ł-gan
fill	bangh-w-	bangh-k-	ha-di-bin,	ha-di-ł-bin
float	â-w-	â-k-	di-'eeł,	di-ł-'eeł
melt	slil-w-	slil-k-	-ghíłh,	-ł-ghíłh

Miskitu and Navajo—like many languages, perhaps most, in fact—show overt morphological reflexes of transitivity in alternating verbs of this simple type. In Miskitu, the intransitive member of alternating pairs is distinguished by the suffixal element *-w-* (Misumalpan **-wa-*, an intransitive formative), while the corresponding transitives are characterized by the element *-k-* (peculiar to Miskitu, but systematically correlated with *-ł-* in the other Misumalpan languages, Ulwa and Mayangna). In the Navajo examples cited, it is the renowned Athabaskan “ł-classifier” which distinguishes the transitive member of each pair, the intransitive counterpart being assigned the phonologically null

⁹This case is not as clear as that exemplified in (24), since ill-formed (25) might also be explained in terms of sentential syntax—a verb must be licensed there by functional categories, e.g., T(ense); the internal verb, V_2 , cannot be licensed since it is not raised to V_1 .

“Ø-classifier”.¹⁰ We assume, however, that the Miskitu and Navajo alternations are the systematic equivalent of the English transitivity alternation. The extensive use of “zero derivation” in English—beside the more usual use of overt morphology in other languages—is a matter of morphological detail. In all three languages, by hypothesis, the verbs at issue here implicate conflation of a complement (a root element of sometimes determinate and sometimes indeterminate category) into the head to which it bears the complement relation. In Miskitu, both the intransitive and the transitive variants of the alternating verbs involve conflation with an affix (as do English de-adjectivals like *short-en*, *thick-en*, see (25-26) above). That is, they involve conflation with a head which is, phonologically speaking, only partially empty. In Navajo, the transitive alternant likewise involves conflation with an affix, the so-called *k*-classifier. Both zero derivation, of the type prevalent in English, and overt derivational morphology, as in Miskitu, are defined by conflation in essentially the same way. The English verb *break* (intransitive) involves the conflation of a root {break}, probably a noun, into an empty verbal head [_V], filling (and thereby eliminating) the empty phonological matrix. Similarly, the Miskitu intransitive verb theme *kri-w-* ‘break’ involves conflation of the root {kri-}, of indeterminate category, into the verbal suffix [_V]w-, filling its left-attached empty matrix. In our stylized arboreal representations, intransitive English *break* and Miskitu *kri-w-* are represented as (28a) and (28b), respectively:



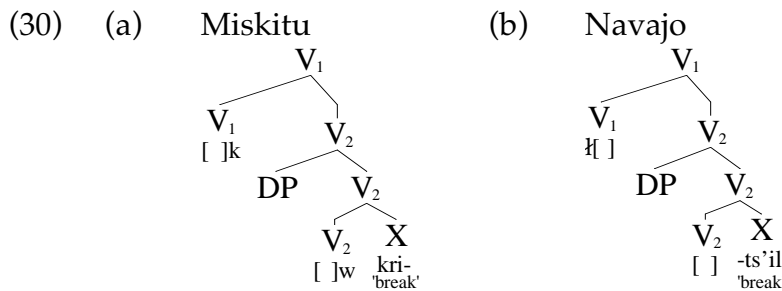
Here again, the diagrams are simply representations of the properties of the heads involved and the corresponding structural configuration embodying those properties—the verbal head has the property that it takes a complement, and the complement has the property that it must appear in a configuration with an appropriately positioned specifier, forcing its verbal host to project that position (occupied here by DP). The structure is accordingly of the composite Ip-dyadic, or (11c), type. In the course of Merge, the verb and its complement conflate eliminating the empty matrix in each case. We will return presently to another “metatheoretical” aspect of these diagrams, namely, the phonological properties and associations of their nuclear components.

¹⁰The term “classifier” is specific to Athabaskan linguistic tradition and is not to be understood in the usual sense. It refers to the immediate pre-stem elements associated with voice and transitivity.

The verbs of (27) are plain unaccusatives. In the present view of verbal argument structure, unaccusatives are simply composite Ip-dyadic, (11c)-type, verbs. The specifier, whose projection is a defining feature of the composite dyadic argument structure configuration, corresponds to the "internal argument" which is the generally accepted defining feature of unaccusatives (Perlmutter, 1978; Burzio, 1981)—it is a specifier, not a complement; it appears as an "object" only in appropriate sentential syntactic uses of the transitive alternant. Under appropriate circumstances (as in the English and Miskitu sentences of (29) below), this argument raises from its "internal" specifier position to function as grammatical subject in sentential syntax. This, in essence, is our theory of unaccusativity.¹¹

- (29) (a) The stick broke.
 (b) Dus ba kri-w-an.
 stick DEF break-INTR-PAST
 'The stick broke.'

Like English *break*, the Navajo intransitive (or "inchoative") alternants of the verbs of (27) show what appears to be zero-derivation, assuming, as seems reasonable, that the so-called \emptyset -classifier is simply the absence of any element in the immediate pre-stem position, i.e., the absence of any overt morphology corresponding to the verbal head in the composite dyadic argument structure. However, while English also shows zero morphology for the transitive alternant, both Miskitu and Navajo have an overt transitivizing element, as depicted in (30):



It is appropriate here to make an aside concerning the actual morphemes involved in these structures, in particular, the phonologically overt elements. The tree diagrams are entirely artificial in this respect. It would appear in the Navajo case, for example, that the correct morphophonological result would be achieved by first merging and conflating X and V₂—giving the the intransitive -ts'il 'break, shatter' by zero derivation—and then by merging and conflating V₂ with V₁, with its prefixed \neg -classifier, giving the transitive \neg -ts'il. In general, this scenario

¹¹This is the theory of "plain" unaccusatives, i.e., so called inchoatives (the intransitive counterparts of "ergative" verbs, in the usage of Burzio, 1981; cf. Keyser and Roeper, 1982). Non-alternating unaccusative verbs of the type represented by *arrive*, *arise*, and the like, are of a different character.

would be reasonable always, if it were consistently the case that conflation simply added morphology. In some cases, to be sure, this actually seems to be true. Consider the following forms in O'odham, a Uto-Aztecan language of southern Arizona and northern Sonora:

(31)	O'odham:	<i>Adjective</i>	<i>Inchoative</i>	<i>Transitive</i>	
	(a)	(s-)wegi	weg-i	weg-i-(ji)d	'red'
	(b)	(s-)moik	moik-a	moik-a-(ji)d	'soft'
	(c)	(s-)'oam	'oam-a	'oam-a-(ji)d	'yellow'

We assume that the O'odham de-adjectival inchoatives are lp-dyadic verbs, derived in the suggested manner, like English *clear* in (18) above, and that the transitive alternants are also derived in the simplest manner, by inserting the inchoative structure in the lp-monadic ((11a)-type) structure, as in English *clear* of (19). The derived transitives appear to involve additive morphology, as if in perfect conformity with the Mirror Principle (Baker, 1985); the intransitive morphology appears innermost, coinciding with the first use of Merge and conflation, and the transitive morphology appears outermost, coinciding with the final use of Merge and conflation. If the situation were always this straightforward, there would be no reason to doubt the reality of structural and morphological representations like (30a), with each head assigned a phonologically determined (perhaps null) morpheme. But, in actual fact, the situation is less often like the O'odham case just cited than like the actual Miskitu case. There is no clear evidence there that the Miskitu transitive and intransitive verbal heads are as indicated in (30a). While the intransitive verbs clearly involve *-w-*, the transitives are not formed by adding morphology to the intransitive formed with *-w-*. Rather, the transitive *-k-* element supplants the intransitive morphology. In effect, the hypothesized intransitive and transitive verbal heads are represented overtly in a portmanteau morpheme, *-k-*. We take this to be evidence in favor of the “late insertion hypothesis” implicated in the Distributed Morphology theory of Halle and Marantz (1993), insuring, in the Miskitu case, and others of a similar nature (e.g., English verbal *shelve*, beside nominal *shelf*), that the context for vocabulary insertion is properly and locally defined—this is possible only after conflation, evidently. Thus, our tree diagrams represent pure argument structure properties alone, as we have said, and our locution to the effect that conflation “fills an empty phonological matrix” is figurative—accordingly, the empty matrix notation, i.e., using square brackets with or without an accompanying affix, is to be taken as an informal notation for zero derivation, on the one hand, and bound morphology, on the other. We will continue to use these diagrams, where convenient, with the understanding that they are abstract informal representations of argument structure properties and not the representation of any actual point, initial, medial, or final, in the derivation of a verbal projection—they could not be that, under the assumptions of a “bare phrase structure” theory of lexical and syntactic projection (Chomsky, 1995) or under the assumption of “late insertion”.

Returning now to the central theme. The possibility of transitivity alternations of the type just exemplified in English, Miskitu, and Navajo, and

O'odham as well, is inevitable, given the essential elements of argument structure. The actual implementation of this alternation in a given language depends, of course, on local factors—diversity begins, so to speak, at this point. Thus, for example, in Warlpiri, a Pama-Nyungan language of Central Australia, the morphosyntactic category V(erb)—defined as the lexical category whose natural extended projections are Infl and Comp—is quite generally invariable in transitivity. It is a morphological property of the language that a verb cannot alter its transitivity. Moreover, it is a morphological fact of Warlpiri that a lexical verb must be inflected, i.e., it must combine with morphology belonging to the functional category of its standard extended projection—i.e., with Infl. For purely morphological reasons, then, lexical verbs in Warlpiri do not transitivity in the simple manner of the English *break*-type or in the manner of the Miskitu or Navajo counterparts.¹² Rather, of the two great parts of speech in Warlpiri, it is the inherently stative category N(oun) which furnishes Warlpiri with its inventory of lexical nuclei which enter into into the composite lp-dyadic argument structure and support both intransitive (inchoative) and transitive derived forms:

(32)	Warlpiri:	<i>Noun</i>	<i>Inchoative</i>	<i>Transitive</i>	
	(a)	wiri maju	wiri-jarri- maju-jarri-	wiri-ma- maju-ma-	'big' 'bad'
	(b)	rdilyki larra	rdilyki-ya- larra-ya-	rdilyki-pi- larra-pi-	'break' 'crack'

The Warlpiri inchoative represents, by hypothesis and rather transparently, the composite lp-dyadic, or (11c)-type, argument structure. The transitive counterpart is presumably formed in the usual manner, by inserting the inchoative into the complement position of the lp-monadic configuration. The derived forms are verbs and, for the morphological reasons given, the transitive cannot be directly formed from the intransitive, i.e., from the inchoative. Instead, the verbal heads are represented in portmanteau fashion by a single transitive verbal suffix, *-ma-* in (32a) and *-pi-* in (32b). The pattern illustrated in (32a) is extremely productive and can be quite freely employed to derive denominal verbs. The second pattern, (32b), is limited to the formation of verbs denoting events involving separation in the material integrity of an entity, specifically, the entity denoted by the argument occupying the specifier position in the lp-dyadic projection.

¹²So far as we know, just two verbs of Warlpiri—perfect synonyms, as it happens—exhibit the English-like transitivity alternation: *kampa-mi*, *janka-mi* 'burn (tr/intr)'. Thus, there may be just this single instance in which English-like zero derivation is used. The inflection requirement precludes adding derivational morphology directly to a Warlpiri root. Here again, there is at least one apparent exception. The root element *palu-*, obviously related to the root of the Warlpiri verb *pali-mi* 'die' does occur directly in combination with the transitive verbal affix *-pi-*, giving *palu-pi-* 'extinguish, kill'.

We maintain that languages cannot differ in relation to the basic elements of argument structure. Nevertheless, the study of the universal principles of argument structure is beset with problems rooted in linguistic diversity. Thus, for example, the existence in principle of the simple transitivity alternation just discussed is inevitable and invariant for languages generally, in the elemental theory assumed here, but its expression in actual languages is variable, as we see from examples considered. The reasons for this have to do primarily with the interaction of separate and autonomous grammatical systems and, to some extent, with options within particular systems; some sources of diversity are set out in (33):

- (33) Some Sources of Linguistic Diversity in the Lexicon:
- (a) Categorical realization of lexical nuclei.
 - (b) Morphological realization of lexical nuclei.
 - (c) Conventional description of eventualities.
 - (d) Selectional properties.
 - (e) Morphological requirements.

The contrast between Warlpiri and English exemplifies (33a). The categorial, or part-of-speech system of English makes a fundamental distinction between adjectives and nouns and between adjectives and verbs. Warlpiri, on the other hand, has a bipartite categorial system, distinguishing verb and nouns, in an extraordinarily rigid manner, with no overlapping membership. Concepts which in English are represented primarily by adjectives (*big, good, long*) or stative verbs (*know, want, fear*) are represented in Warlpiri by nouns (*wiri, ngurrju, kirrirdi; pina, ngampurrpa, lani*). And it is members of the large N(oun) category that function in the complement h-position in derived verbs of the composite lp-dyadic type of (11c) above. So while few English nouns can force the projection of a specifier and thus appear in the lp-dyadic argument structure (exceptions being certain nouns of physical separation, e.g., *break, split, crack*), many Warlpiri nouns can (in fact, most Warlpiri nouns can). This fact has quite understandable consequences for the overt language-specific expression of the basic elements of argument structure. While the basic elements are invariant, their overt expression is variable—since it involves the interaction of separate systems of grammar, it would be miraculous if there were no variability here. Any cross-linguistic comparison will illustrate this elementary fact of language diversity. Navajo, for example, differs from English and Warlpiri alike. Like Warlpiri, it makes a fundamental two-way distinction between nouns and verbs, but it names conditions, attributes, and states by means of verbs, not nouns, reserving this category for entities, primarily.¹³

¹³We define the parts of speech (N, V, A, P) in morphosyntactic terms—i.e., in terms of their characteristic "extended projections" (cf., Grimshaw, 1991) in sentential syntax. Thus, in English, a noun belongs to the lexical category extended in sentential syntax by Num (number), D (determiner) and K (case), while a verb belongs to the category extended by I(nfl) and C(omp). Some languages (e.g., Salish, cf., Jelinek and Demers, 1994) do not distinguish among lexical categories in this manner, using an undifferentiated lexical root with all inflection, and in some

The English predisposition for zero derivation is in contrast with the prevailing derivational patterns of many other languages, illustrating (33b), another source of cross- and intra-language diversity. While conflation of an overt X° from complement position into a phonologically null head is—by hypothesis, at least—typical of the derivation of denominal verbs and derived transitives in English, it is not typical of Warlpiri, or of Navajo, or of Miskitu, where conflation is generally of overt X° -level complements with overt (albeit affixal) heads. Internal to English itself, of course, there is diversity—some English denominal and de-adjectival verbs involve overt derivational morphology (affixal, or in the form of ablaut).

There is no guarantee, or necessity, that languages should agree in their conventional descriptions of entities, events, conditions, and states—where these are understood as something outside language, related to language only by the names they are given, i.e., through the manner in which particular languages conventionally refer to them by means of expressions listed in the lexicon. This is (33c), a vexing source of diversity, vexing because it masks what is universal to an extraordinary degree, presenting numerous apparent violations of the Universal Alignment Hypothesis of Relational Grammar (Perlmutter, 1978; and cf., Rosen, 1984) and the Uniformity of Theta Assignment Hypothesis (Baker, 1988). There are many isolated examples of this—e.g., some languages refer to the event or process of falling using an lp-monadic structure (roughly paraphrasable as "do a fall") while others use the lp-dyadic structure (like English "drop") to name the same phenomenon (cf., also many relevant discussions in Levin and Rappaport, 1995).

There are systematic cross-linguistic differences in relation to (33c) which are interesting and which have been discussed, in one way or another, in the literature (for extensive cross-linguistic discussion of the reflexive in forming the "middle voice", see Kemmer, 1988; and for an excellent treatment of the middle in a single family, see Thompson, 1996). Consider the following O'odham forms:

(34)	O'odham:	<i>Transitive</i>	<i>Detransitive (reflexive)</i>	
	(a)	mulin	'e-mulin	'break'
	(b)	hain	'e-hain	'shatter'
	(b)	kuup	'e-kuup	'close'
	(c)	kuupi'ok	'e-kuupi'ok	'open'

Like many other languages (e.g., Romance), O'odham possesses a large number of verbs whose "notional" inchoative is derived from the transitive. It is not the simple intransitive emerging directly from the composite lp-dyadic (11c)-type structure; rather it is the derived form sometimes termed the "anticausative", an argument structure of explicitly reduced adicity. We believe that this arises in the following way. For O'odham, and for other languages which show this

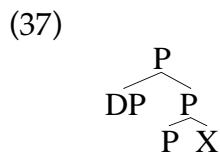
cases it is not possible to assign a category to a given lexical root, since it appears only in derived form (e.g., the Miskitu alternating verbs of (27)).

pattern, verbs in this conceptual category are formed on the *basic* lp-dyadic configuration, like location and locatum verbs. In other words, processes of the type represented by breaking, opening, shattering, and the like, are named in O'odham by lexical entries of the (11b)-type, not the (11c)-type. It is generally true that location and locatum verbs are transitive—they lack a simple inchoative form; this is true in English and O'odham alike:

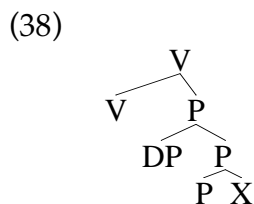
- (35) (a) She shelved the book.
 (b) *The book shelved.
 (c) I saddled the horse.
 (d) *The horse saddled.
- (36) O'odham:
 (e) Kawyu 'ant si:l_dad.
 horse AUX1s saddle-APPL₁
 'I saddled the horse.'
 (f) Cu:kug 'ant 'on-mad.
 meat AUX1s salt-APPL₂
 'I salted the meat.'

As in English, so also in O'odham, denominal locatum verbs (there being no denominal location verbs like English *shelve*) lack a corresponding simple inchoative, though an "intransitive" of sorts can be formed from the transitive, in the manner seen in (34).

The essential transitivity of location and locatum verbs follows, we believe, from the fact that the basic lp-dyadic argument structure is not verbal in its default categorial realization. It is fundamentally a projection of the lexical category P, not V:



Unlike the default composite lp-dyadic structure, which is verbal, the basic dyadic structure, being a P-projection, cannot "function verbally", so to speak, since it is incompatible with the canonical extended projection of a verb. This makes it impossible for (37) to function as a simple inchoative. It can, of course, give rise to a derived verb by appearing in the complement position of the lp-monadic structure of (11a):



This is a transitive structure, of course. Under ordinary circumstances, as in the well formed sentences of (35, 36), the DP argument (in the inner specifier position) will function as sentential syntactic object.

Assuming that the O'odham verbs of (34)—and their Romance counterparts, among others—are built upon on the basic (11b)-type dyadic structure, their basic transitivity follows. And it follows as well that their "intransitive" use, so to speak, is *derived*, not *basic*. That is to say, the use of these verbs in which the internal argument functions as sentential syntactic subject is derivative of the transitive (cf., Reinhart, 1996). In an O'odham sentence like (39b) below, the internal specifier is formally linked to the external subject position through the morphological device of reflexivization:

- (39) (a) Kawyu 'at mul g ñ-nowi.
 horse AUX3 break:PERF ART 1s-arm
 'The horse broke my arm.'
- (b) Ñ-nowi_i 'at 'e_i-mul.
 1s-arm AUX3 REFL-break:PERF
 'My arm broke.'

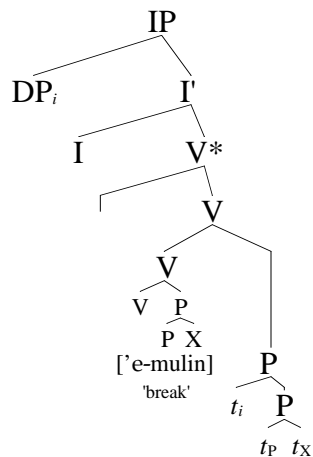
More must eventually be said, of course. While they can (under appropriate conditions) be understood as literal reflexives, these morphologically reflexive verbs are, in the sense which is relevant here, semantically inchoatives in the generally understood sense, effectively monadic in sentential syntax and utterly devoid of agency or volition on the part of the subject, and utterly lacking in any implied agentive argument.¹⁴ In the cases at issue, then, the relation between the internal and external positions is to be understood as that implied by a Chain, not as that implied by mere binding between autonomous arguments. It is as if the reflexive morphology converted the transitive verb into a raising verb, permitting the internal argument to raise from its basic specifier position into the sentential subject position, as in the simple inchoative construction, with the difference, of course, that it is raising from a position governed by the derived verb, as in the passive of sentential syntax.

To account for this (in part, setting aside the issue of agency), we assume that verbs like O'odham *'e-mulin* 'break (reflexive)'—and their like in other

¹⁴The relation between the syntactic subject and the verb yields a "property" interpretation, in the terminology of Barbiers (1997), rather than the interpretation assigned to canonical transitives involving two distinct (though possibly "coreferential") arguments. The derived, "detransitivized" verb is often seen as the result of "role reduction"—in Reinhardt (1966), unaccusatives are derived from transitives by the reduction operation. The question we must face is whether (i) this is true of all apparent unaccusatives and (ii) whether all apparent unaccusatives should be classed together (setting aside here the *arrive / arise*-type, which have special properties). We doubt the "role reduction" view of intransitive *break* and the like, since our analysis of them implicates a *single* argument in the basic lexical structure attributed to them, even where "reflexive morphology" is involved in deriving the sentential syntactic "intransitive".

languages—are derived from a transitive base, as suggested. They are fundamentally transitive, by hypothesis, because they are built upon the basic dyadic, (11b)-type structure, whose nuclear category is P, not V, in the default case; their verbal character comes not from the innermost head but from the (11a)-type matrix structure in which the P-based dyadic structure is embedded. This is depicted in (38). The reflexive morphology appearing in the derived intransitive is a sentential syntactic reflex, so to speak, of the “detransitivization” of the verb and of its corresponding inability to assign case to the specifier it locally c-commands and governs, i.e., to the argument (DP_i in (40) below) which would otherwise appear as its object.¹⁵ This argument raises to the sentential syntactic subject position where it is appropriately licensed—let us suppose, for present purposes, that its ultimate landing site is the Specifier position of IP:

(40)



Thus, the reflexive here is not a "true" reflexive. Rather, as suggested, it is a morphological reflex of formal detransitivization. The essential contrast between O'odham and English—exemplifying diversity in the conventional naming of event types, i.e., (33c)—lies at the more abstract level. Specifically, the contrast is in the use of a fundamentally transitive (O'odham), as opposed to fundamentally intransitive (English) lexical argument structure in naming the process-types of "breaking", "opening", and the like.

The morphology associated with detransitivization of the type just exemplified is variable across languages. The O'odham pattern is common, in which reflexive morphology belonging formally to the object agreement system is used (see Kemmer, 1988, and Thompson, 1996, as well as references cited there, for much relevant discussion). In other languages, *verbal* derivational morphology is used, as in the passive. This is the case in many Australian languages, e.g., Lardil of the Wellesley Islands, North Queensland:

¹⁵The derived intransitive verb is bereft of its case-assigning powers. In the framework developed by Bittner (Bittner, 1994; Bittner and Hale, 1996) this amounts to removal or demotion of a V-adjoined nominal element (V-adjoined D) which, in the transitive counterpart, would force the verb to "Case-bind" its object, assigning it Accusative case.

(41)	Lardil:	<i>Transitive</i>	<i>Detransitive (and passive, reflexive)</i>	
	(a)	derlde	derlde-e	'break'
	(b)	kalnya	kalnya-a	'split'
	(c)	dirrbe	dirrbe-e	'stretch'
	(d)	jidma	jidma-a	'raise, rise'

The derived intransitives here belong to the regular conjugation of Lardil verbs—i.e., the morphology of the derived form is verbal in category. Although it is homophonous with the passive and reflexive, in the use of interest here, the derived verbs formed with it are semantically monadic, like standard inchoatives; the sentential syntactic subject is not agentive, nor is there any "suppressed" external agent.

In some languages detransitivization is morphologically unmarked, so that the transitive and intransitive variants are simply homophonous, as in the transitivity alternation of English. As a matter of empirical study, there is a problem in such cases of homophony—namely, the issue of which is basic, the intransitive or the transitive. And correspondingly, what is the "direction" of derivation? Is it transitivization of an inchoative, or is it detransitivization of a basic transitive? There is, of course, a respectable methodological and theoretical tendency which would assume that there is only one direction for all languages, that there is no ambiguity. In this view, notional unaccusatives, for example, are universally of one structure. And their transitive counterparts are likewise of one structure. Only one analysis is appropriate, universally. We doubt this. For one thing, where derivational morphology is overt, we can see the direction of derivation (by virtue of the Mirror Principle), and we know from overt morphology that both derivational "directions" are possible, transitivization (e.g., the O'odham de-adjectival verbs of (31)) and detransitivization (e.g., O'odham verbs of the *break*-type in (34)). Where there is no overt derivational morphology, the study is more challenging. And it is not clear that it is necessarily determinate in all cases. The potential for ambiguity is inherent in the very nature of the theory of argument structure; while the basic elements are universal, the possibility of diversity, and its actuality in fact, begins smartly with the realization of the structures they define. What is basic and universal in argument structure cannot, in and of itself, limit such factors as those set out in (33).

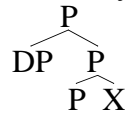
In summary, before proceeding to additional examples, we are proposing that the conventional language-specific names of event and process types informally termed "notional unaccusatives" or "notional inchoatives"—i.e., processes like *breaking* and *opening*, and the like—are lexical verbs formed either on the basic dyadic argument structure (11b) or on the composite dyadic argument structure.¹⁶ Moreover, we propose that the default, unmarked,

¹⁶This is not surprising, of course, since these two structures are virtually identical (cf., Déchaine, 1995, for a distinct and very promising treatment of verbs which we assign to the composite dyadic argument structure).

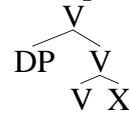
categorial realization of the heads of these elemental argument structure types is as indicated in (42):

(42) Default categories:

(a) Basic Dyadic (11b)



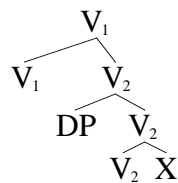
(b) Composite Dyadic (11c)



Thus, the natural head of the first is adpositional (preposition or postposition), while that of the second is verbal. This difference is no doubt predictable from the unmarked realization of the complement X, nominal in the basic dyadic, predicative in the composite dyadic (e.g., A(djjective), in the languages that distinguish this category). If the category of the head is indeed predictable, we can only mention that fact here, as it is beyond our ability to discuss knowledgeably. Be this as it may, the natural categorial realizations of these projections have immediate implications for transitivity, as we have seen.

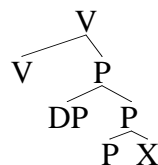
The composite dyadic argument structure is basically verbal and its complement is predicative; in the absence of further modification, therefore, its specifier argument will raise to assume the subject function in sentential syntax. It is fundamentally intransitive in the understood sense. Its transitive counterpart must be derived, by insertion into the complement position of a verbal structure, typically the monadic (11a)-type, V_1 of (43) below. Thus, the derivational direction is necessarily transitivity, the intransitive being basic:

(43)



By contrast, the basic dyadic structure is of the P-category. Its verbal form must itself be derived, by insertion, as shown in (44):

(44)



This structure is fundamentally transitive, since the verbal head commands the specifier argument of its dyadic complement, just as in the derived transitive (43). Without further modification, the DP argument in both (43) and (44) will function as the sentential syntactic object, fulfilling the expectations for a conventional transitive clause. The intransitive counterpart of (44), where it exists, must be derived (as in the O'odham and Lardil examples cited). Thus the derivational direction in this case is detransitivization.

As mentioned above, detransitivization may be morphologically non-overt. Guerssel's lexical study of the Ait Seghrouchen dialect of Berber (Middle Atlas, Morocco) provides an interesting example (Guerssel, 1986). It is embedded in a system of some complexity, and we will deal with just a small part of it here—and we will refer to the language simply as Berber, with the understanding that the examples, taken from Guerssel's study, have the dialect association noted.

Berber possesses a class of intransitive verbs which are based on the composite dyadic structure; a typical member of this class is illustrated in the sentence (45a), and its transitive counterpart is given in (45b):¹⁷

- (45) Berber:
- (a) Y-zyert wfuli.
 3ms-long string:CST
 'The string is long.'
- (b) Y-ss-zyert wrba fuli.
 3ms-TRANS-long boy:CST string
 'The boy lengthened the string.'

The single DP argument of the intransitive, (45a), is in the Construct State (CST), as is normal for a subject. In the corresponding transitive, the subject, i.e., the external argument is likewise in the Construct, as expected, while the object is in the plain form, as expected of an object. This latter argument corresponds, of course, to the subject of the intransitive (and, by hypothesis, to the specifier of the composite dyadic (11c)-type structure upon which both the transitive and intransitive are based).

This is quite straightforward. Transitivity of the intransitive proceeds in the same way, abstractly, as does the transitivity of a de-adjectival verb in English or O'odham—i.e., it is simply inserted as the complement of the monadic (11a)-type structure, an inevitable possibility in the elemental theory of argument structure under consideration here. In English, of course, transitivity of a de-adjectival verb is morphologically non-overt, the transitive and the intransitive being identical. In O'odham, by contrast, it is overt. Berber conforms to the O'odham pattern—thus, the nucleus of the matrix is an overt verb, appearing in Berber as the prefix *ss-* (glossed TRANS(itive) by Guerssel) in the conflated verb word. The direction of derivation here is rather clearly transitivity, deriving the transitive from the intransitive.

¹⁷Predicators in this class occur in two stativity classes; (45) involves a stative example. We do not account for stativity. Guerssel assumes that there is a specific stativising rule, an idea which seems to us to be convincing, given his discussion. We have not determined how this interacts with the basic elements of argument structure as conceived here.

There is another class of verbs, however—namely, those which Guerssel calls “ergative”, following the usage of Burzio (1981), and of Keyser and Roeper (1984). They include verbs of *breaking* and *opening*, and, as expected, they enter into the transitivity alternation, as exemplified in the sentences of (46):

- (46) Berber “ergative” verbs:
- (a) T-rZem tewwurt.
 3fs-open door:CST
 ‘The door opened.’
- (b) Y-rZem wryaz tawwurt.
 3ms-open man:CST door
 ‘The man opened the door.’

There is no overt morphology corresponding to transitivity, in the case of (46b), or detransitivization, in the case of (46a). The direction of derivation is, therefore, not obvious. We might simply assume that in the absence of overt morphology, the direction is always from the simpler structure (the intransitive or inchoative) to the more complex (the transitive). But there is evidence that this is not true in the Berber case. Verbs of the type represented by *rZem* ‘open’ in Berber cannot be overtly transitivity:

- (47) Berber **ss-rZem*:
- *Y-ss-rZem wryaz tawwurt.
 3ms-TRANS-open man:CST door
 ‘The man opened the door.’

Under appropriate assumptions, this follows from the general fact—already noted in relation to the English constructions exemplified in (13) above—that transitives cannot *further* transitivity in the simple manner otherwise given as an inescapable option (overridden only by exception) in this conception of argument structure. Transitivity is only successful if the “inner” projection presents a specifier argument which will function as sentential syntactic object. Transitives, built on monadic (11a)-type structures, as depicted in (44), do not have a specifier—the subject of a transitive is an *external* argument, not a specifier within the lexical projection. That further transitivity of a basic transitive is impossible is shown independently for Berber by the following:

- (48) Berber **ss-wt*:
- *Y-ss-wt wmdakkwl-inw mucc aryaz.
 3ms-TRANS-hit friend:CST-1s cat man
 ‘My friend made the man hit the cat.’

Guerssel (1986) argues against the idea that this is ungrammatical for reasons of Case, maintaining instead that it is a matter of constraints on argument structure (specifically, in his account, it involves a failure in the linking of argument positions to variables in Lexical Conceptual Structure (LCS)). In the present framework, (48) is impossible for the reasons given—if *ss*-transitivization is simple transitivization of the type involved in deriving the transitive de-adjectival verbs (*clear the screen*, *narrow our options*, and the like), it is successful only when applied to a lexical argument structure which projects a specifier. Transitives and unergatives do not project a specifier, by hypothesis, hence the impossibility of (48). And, if the Berber verbs at issue—verbs of opening, breaking, splitting, and the like—are basically transitive, then (47) follows straightforwardly as well. On the basis of this, we must recognize the existence of “zero” detransitivization.

As an aside, it should be mentioned that the matter of derived transitivity is complicated by the fact that many languages have a “true causative” formed with affixal morphology. This must be distinguished carefully from transitivization, and the task is not always straightforward. The situation is made even more complex by virtue of the fact that the causative and transitivizing morphologies may overlap in form. Berber *ss-* is a transitivizing element (i.e., by hypothesis, a verbal nucleus projecting the monadic (11a)-type structure), not a causative formative. This can be seen by its behavior. If it were a causative verb (affixal in form), it would accept as its complement virtually any verbal projection, including transitive and unergative verbs with their external subject (a VP-adjunct in Bittner, 1994; and cf. also the early proposal of Koopman and Sportiche, 1991); the limits on causativization are determined by sentential syntactic licensing concerns (Case, Agreement), not by factors inherent to the theory of lexical argument structure. So far as we can determine (cf., Guerssel’s extensive discussion of the matter in a somewhat different framework), Berber *ss-* occurs successfully only with complements which project a specifier as a basic property of lexical argument structure. Hence, this element is transitive morphology, not causative morphology.

We conclude from the foregoing that it is a fact, observationally, that there is a morphological ambiguity in the transitive and intransitive realizations of verbs based on the dyadic lexical argument structures, in cases where the relevant derivational morphology is non-overt. That is to say, either the transitive or the intransitive could be the derived form, the other being basic. This could, of course, present a learnability problem. Which form does the learner determine to be the basic form and which the derived form? Are there genuine cases of indeterminacy? Is English *break* basically transitive or intransitive? Is the de-adjectival verb *clear* basically intransitive or transitive? Before taking up this question again, we will consider another example of morphologically non-overt transitivity alternation.

In his study of transitivity alternations in Standard Arabic, Fassi Fehri (1987) considers, among others, apophonic and zero alternations like those exemplified in (49) and (50), asking precisely the question just posed—which alternant is basic?

(49) Standard Arabic:

(a) ʃazina r-rajul-u.
sad:PST:3ms DEF-man-NOM
'The man was sad.'

(b) ʃazana r-rajul-a.
make:sad:PST:3ms DEF-man-ACC
'He made the man sad.'

(50) Standard Arabic:

(a) ha:ra l-bina:'-u.
collapse:PST:3ms DEF-building-NOM
'The building collapsed.'

(b) ha:ra l-bina:'-a.
make:collapse:PST:3ms DEF-building-ACC
'He made the building collapse.'

This alternation involves a minimum of overt morphological change. The second vowel is regularly /a/ in the transitive. The sole overt change, then, is observed in the verbs whose intransitive has a second vowel other than /a/, as in (49a), where that vowel is /i/. There is no visible change, of course, in cases where the second vowel is /a/ in the intransitive, as in (50). There is no shift in "form", both the transitive and the intransitive being of Form I (i.e., traditional *faʿala*). By contrast, other diathesis changing processes in Arabic do involve a shift in form.

An examination of Fassi Fehri's examples, and of further examples in the Arabic lexicon, makes it reasonable to assert that the alternation exemplified in (49-50) belongs to the "automatic" type which has been under discussion here—i.e., the type built upon the argument structure in which a specifier is projected, hence (11b) or (11c). Fassi Fehri argues that the "direction of derivation" is from the intransitive to the transitive; in his terminology, "apophonic causativization is morphological", which is to say, the transitive involves a morphological addition, as in the causative. For the reasons given above, we avoid the term "causativization" in reference to this type of automatic transitivization. Nonetheless, we believe he is correct in his conclusion; his argument is interesting and instructive, we think.

While transitive verbs can causativize, in the sense of "true causativization", the transitive alternants in pairs of the type represented by (49-50) cannot. Nor can transitives formed by overt "true" causativization. In

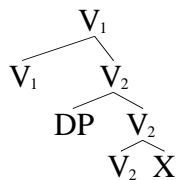
general, derived transitives cannot be formed on transitives which are already derived. Fassi Fehri formulates the following generalization for Standard Arabic:

- (51) Standard Arabic:
 Derivational causativization is limited to one application.

If the transitive alternant of (49-50) and their like is a *derived* transitive, then it follows that it cannot be further transitivized, given (15). Putting the matter the other way. The fact that the transitive alternant cannot be *further* transitivized (i.e., overtly causativized) indicates that it is itself a *derived* transitive. With the reservations indicated in relation to the use of the term "causativization", we accept this reasoning entirely. The question is, what explains (51)? Narrowing and rephrasing the question somewhat, why should it be the case that causativization cannot apply to a derived transitive?

We assume that the intransitive alternant in (49-50) corresponds structurally to the internal verbal projection V_2 in (52), while the transitive alternant corresponds to the structure as a whole, i.e., to V_1 together with its complement V_2 :

(52)



We understand perfectly well why "automatic" transitivization cannot further transitivize this structure, since V_1 projects no specifier. But why can't (52) be *causativized*? True causatives in Arabic are not limited to structures with lexical specifiers, we know, since basic lexical transitives can be causativized, just as English transitives can be causativized by means of *make*, *cause*, and *have*. But why can't *derived* transitives be causativized in Arabic?

We think that the answer to this question is to be found in the lexical morphological properties of the derivational morphology involved. We illustrate first with an example from English.

The verb *grow* as in (53) below, has both intransitive and transitive uses:

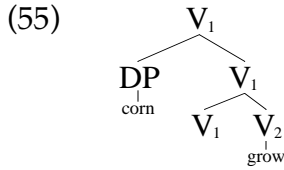
- (53) (a) Corn grows (fast, well).
 (b) We grow corn.

There is also a related derived nominal, *growth*, which involves only the intransitive variant (cf. Chomsky, 1972):

- (54) (a) the growth of corn (is fun to measure)
 (b) corn's growth (is fun to measure)

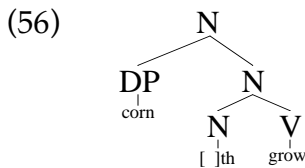
(c) *our growth of corn (started in 1955)

Under our assumptions, *grow* is a composite dyadic, (11c)-type, element, appearing in the structure presented in (55):

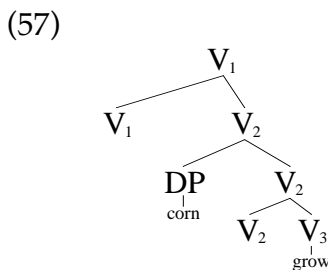


Thus, while *grow* is morphosyntactically a member of the category V, its argument structure is that of a (11c)-type head, typically represented by an adjective in English. Be that as it may, *grow* takes a verbal host which projects a specifier, satisfying its fundamental lexical property. As usual, the empty host V_1 conflates with its complement, giving the simple verb *grow*.

The structure assumed in (55) is crucial to understanding the derivational asymmetry embodied in (54). At least, it is crucial in the framework we assume. The derivational suffix *-th* has the property that it selects a limited set of lexical items—generally adjectives, such as *long*, *wide*, *high*, *strong*, etc., but also the verb *grow*. That is to say, *-th* strongly selects lexical items, which we interpret to mean that it takes them in complement position, in a basic dyadic configuration which it heads (see Marantz, 1995, for a conceptually similar view within the Distributed Morphology framework):



It follows from this fact of selection, that *-th* cannot nominalize the transitive variant of *grow*. The transitive structure is as in (57):



The derivational suffix *-th* selects just the members of a small set of phonologically overt predicates, as noted above. It cannot, therefore, select the transitive structure (57), as that would involve selecting an empty head, V_1 , impossible by hypothesis, and in contrast to “productive” derivational morphology, like *-able*, which is restricted only by category, not by list (see the

third chapter of Pesetsky, 1995, for much relevant discussion within a distinct framework).

The account of *growth* just sketched is an attempt within the present framework to express the principle inherent in the restriction on derivations which has come to be known as “Myers’ Generalization”:

- (58) Zero-derived words do not permit the affixation of further derivational morphemes (Myers, 1984).

Although our claim is that certain derivational morphemes have the property that they select members of a particular set of stems, and therefore do not select empty heads (which have no morpholexical properties at all), the effect is closely similar to the idea expressed in (58). However, we believe, with Fabb (1988) and Pesetsky (1995) that (58) is properly contained in a larger generalization about derivational morphology.

The generalization has to do specifically with the selectional properties of derivational morphemes. Some derivational morphology is “productive”, some is not. The morphemes at issue here are generally non-productive, restricted to particular stems, and are therefore incapable of selecting an entire morphosyntactic category, say verb, including both overt and non-overt members. Thus, because of the local nature of selection, it is in the lexical representation itself that a “zero head” is prohibited from intervening between derivational morphology (of the type involved in *growth* and *gift*) and a stem element (*grow*, *give*). For this particular type of derivational morphology, let it be symbolized Y, there can be no lexical configuration of the following type, where X is a stem and V is an empty head of category V:

- (59) [_Y [_V [X] V] Y]

Although Y might indeed select X, it cannot appear in this structure, because it cannot select V, by the very nature of both V and Y. This is the sense in which Y-type morphology cannot be separated from X by an empty (i.e., zero) element. Since it is a fact of selection, the prohibition is in force in lexical argument structure representation. And furthermore, since it is a fact of *selection*, it is not really a fact about empty, or zero, morphemes, an observation which we owe to Fabb (1988) who argues in detail for the view that selection is what is at work in constraining affixation in English (and see Pesetsky, 1995, for development of an explicit theory of the multiple consequences of this idea within a different view of the relevant derivational morphology). It follows, then, that V of (59) could in fact be overt, just not selected by Y.

Returning to the Arabic case, the generalization embodied in (51) is, we suggest, a reflex of selectional properties. Standard Arabic causative morphology (deriving *fa ala* and *f ala* verb forms, for example) selects basic verbal roots, not derived verbs. And, by hypothesis, this holds both for overt derivational morphology and zero derivational morphology. In relation to the alternation

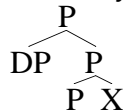
exemplified in (49) and (50), the intransitive variant can be overtly causativized—e.g., the Form IV causative *a zana* 'to sadden, make sad'. But the transitive cannot be—there is no derived causative corresponding to the sense "cause X to make Y sad", or the like. This is to be expected if (i) the causative selects basic root verbs and (ii) the transitive variant in (49-50) is derived, not basic.

Morphologically overt lexical processes affecting the transitivity of verbs can derive transitives from intransitives, and intransitives from transitives. We see this in O'odham, where the direction of derivation is clear and both directions are found. And we have some evidence that morphologically non-overt derivation can also apply in either direction. Guerssel's study of Berber suggests that that language has morphologically non-overt detransitivization, i.e., derivation of the intransitive from the basic transitive, unmarked by overt morphology. And Fassi Fehri's study of Standard Arabic suggests that the direction of derivation for zero and apophonic derived verb forms is from intransitive to transitive. If this is true, then the methodological problem, and potential learnability problem, is real. How do the analyst and learner determine the basic lexical argument structure of an alternating verb?

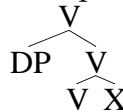
Setting aside the possibility that many cases will be indeterminate, the answer will probably come from considerations of the default, or "natural", categorial realizations of lexical argument structures of the dyadic (specifier projecting) type. These default realizations are shown in (60), repeated from (42):

(60) Default categories:

(a) Basic Dyadic (11b)



(b) Composite Dyadic (11c)



As suggested earlier, lexical items which are headed by the verbal category—i.e., (60b)—will be basically intransitive and, accordingly, will undergo transitivity alternation, assuming the language has transitivity alternations of the type being considered here. Those which are basically non-verbal—e.g., those headed by P instead of V—will necessarily be transitive in their verbal metamorphosis (as in (44) above). Accordingly, this class will undergo detransitivization if it enters into any transitivity alternation.

This is of little help, of course, in the absence of any indication of the category of the head in (60a,b). In zero derivation, this head will be empty in either case, giving no clue to its categorial identity, and it will conflate with the higher empty V rendering the two kinds of transitives—the basic transitive, built on (60a) and the derived transitive built on (60b)—effectively indistinguishable.

Perhaps it is in the nature of the complement X, not just the head, that the verbs derived from the dyadic structures of (60) are to be distinguished. We have postulated that the complement category associated with the composite dyadic argument structure of (60b) has the essential properties typically adhering to the

category A(djective), in those languages which distinguish that category. Members of this class of elements require a specifier, appropriately positioned. This condition is perfectly satisfied by a host verb, giving us the basic intransitive (and unaccusative) verbal projection straightforwardly. On the other hand, it is the category N(oun) which is the natural realization of the complement of P, the default realization of the head of the basic dyadic structure (60a)—and, as noted, a verb built upon the P-headed dyadic structure (60a) is, *ceteris paribus*, transitive by virtue of the sentential syntactic structural relation holding between the commanding verbal head and the DP of the inner specifier position (i.e., between V_1 and DP in (52)).

If this line of thought is correct, it is not an accident, for example, that O'odham de-adjectival verbs undergo transitivization, while O'odham transitive verbs which undergo detransitivization have no discernible adjectival etymology. Nor is it an accident that English denominal location and locatum verbs (cf. (20) above) are resolutely transitive, while de-adjectival verbs (cf. (16) above) are alternating.

In Berber, and in many other languages, the issue is somewhat more subtle. Basic intransitive verbs, i.e., those which transitivize in the manner of (45b) above, include *zyert* 'be tall' and the following in addition:

(61) Berber basic intransitives:

(a)	drus	'be scanty'	riw	'be wide'
	mellel	'be white'	sdid	'be thin'
	meqqeR	'be big'	Zid	'be sweet'
(b)	aff	'swell'	fsy	'melt'
	ghmy	'grow'	zwa	'become dry'
	jen	'fall asleep'	bedd	'stand up'

Berber verbs which we have assumed to be basically transitive, and which detransitivize in the manner of (46b), include *rZem* 'open' and the following, among others:

(62) Berber basic transitives:

bDu	'split'	rZ	'break'
fly	'crack'	cni	'straighten'
qqen	'close'	Dern	'flip'

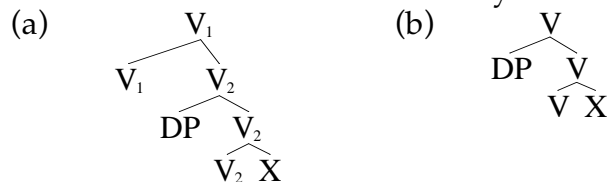
Like Navajo, and an impressive number of other languages of the world, Berber lacks a distinct morphosyntactic category A(djective). However, the verbal category in Berber, as in Navajo and other languages, includes a large number of stative and inchoative predicators (e.g., (61a,b) above) which have the properties which are relevant here and which are associated with adjectives in English. And, while translation is not an entirely accurate indication of relevant arguments structure properties, there is a suggestive, though rough, correlation. Thus for example, Berber verbs of the type represented by (61) generally translate

into O’odham as de-adjectival verbs of the putative composite dyadic (11c)-type, or else as monomorphemic verbs of that same argument structure type—their transitive counterpart is therefore derived (overtly, in O’odham) from the intransitive. On the other hand, Berber verbs of the type represented by (62) generally translate into O’odham as basic transitives, their intransitive counterpart being derived, and signalled overtly in that language by means of reflexive morphology.

The fact that there is a high degree of cross-linguistic agreement in the classification of verbs—as basic transitive, basic intransitive, unaccusative, ergative, unergative, and so on—encourages the belief that the argument structure type of a verb can be predicted “from its meaning”. While there is surely some truth in this, and while meaning is a fine heuristic, its use is methodologically incorrect within the framework we are assuming here, not merely because meaning is slippery, a thin reed to lean on, but because we maintain that certain crucial aspects of meaning are dependent on the very *structural* features whose identification is at issue. If we “knew the meaning”, we would know the structure, perforce, because we know the meaning *from* the structure. This, of course, is precisely what we mean when we say that the meaning is a valuable heuristic, but no more.

We return now to English, in which the transitivity alternation is not itself associated with any overt morphology. Although we can generally tell when an alternating verb is de-adjectival (*clear, redden*), and we can argue that some alternating verbs are denominal (*crack, break, split*), we have no morphological evidence for the *direction* of the alternation. Is it transitivization of a basic intransitive? Or is it detransitivization of a basic transitive? Let us review the problem more explicitly. Consider again the following two structures, recalling that these are abstract representations of the basic properties of relevant verbs of English:

(63) Transitive and Intransitive with Dyadic Verbal Base:



We refer to (63a) as “transitive” because, under normal conditions of sentential syntax it will require an external argument, and the derived verb will assign case to the internal argument, i.e., the DP in the specifier position of the inner verbal projection, V₂. If English *break*, for example, is basically transitive—i.e., if it is basically (63a)—its intransitive counterpart will be derived from that structure by means of some mechanism which forces the inner DP argument to raise to sentential subject position (preventing an “external” argument from appearing there). We assume, as in the O’odham case already discussed, that the derived verb in V₁ position is deprived of its ability to assign case in some manner. We will assume the theory of Bittner (1994), according to which the verb loses its

(phonologically null) adjoined D, the element which, under normal circumstances, forces a transitive verb to Case Bind, and assign case to, its object in a Nominative-Accusative language (cf. also, Bittner and Hale, 1996).

If, on the other hand, English *break* is basically intransitive, then its argument structure is that depicted in (63b). This is straightforwardly intransitive, and the DP argument in specifier position must raise in sentential syntax as a matter of course. The two configurations are essentially the same. Both are “unaccusative” in the traditional sense that the sole argument (sentential subject) is an internal argument in lexical argument structure. Accordingly, we do not think of detransitivization of (63a) as a “reduction” in diathesis or valency. There is no deletion or absorption of an external role or binding of an internal role, since there is only one “role” in both cases, namely, the DP in specifier position. The external argument of the transitive enters into the picture only when the verb is in fact transitive and assigns case to the internal argument. Burzio’s generalization is a natural consequence of the framework as it functions in these cases.

Now, to repeat our basic question, which structure is assigned as basic to the alternating verbs, (63a) or (63b)? Suppose we say, first, that in the absence of morphological evidence, all such verbs have the same basic structure—so that English *break* and *clear* have the same argument structure (unlike Berber *rZ* ‘break’ and *zwa* ‘become dry’, for example, which have different basic structures). And further, in relation to the question of *which* of the two structures is basic, suppose we say that, in the absence of morphological evidence, all such verbs have the simplest structure and, consequently, the simplest derivation:

- (64) Basic Argument Structure:
In the absence of counterevidence, a verb has the simplest possible argument structure.

Clearly, the simplest structure in this instance is the intransitive, (63b), since it is mononuclear and enters straightforwardly into sentential syntax as an intransitive, i.e., without any special detransitivizing provision.

There is some evidence that the principle given informally in (64) is correct. If (64) were not a genuine principle constraining zero derivation, then detransitivization of the proposed type, i.e., unannounced by overt morphology, should range more freely than it does in the vocabulary of a language like English. So, for example, locatum and location verbs, should undergo morphologically non-overt detransitivization. But they do not, as seen in (35) above, repeated here as (65):

- (65) (a) She shelved the book.
(b) *The book shelved.
(c) I saddled the horse.
(d) *The horse saddled.

This follows in part from (64). In the case of locational and locatum verbs, the simplest structure is the transitive, since the default, or natural, realization of the internal dyadic structure on which they are built is (66a), P-headed with a nominal complement, and their verbal category is acquired by appearing as the complement in a V-headed monadic, (11a)-type, structure, i.e., (66b) below. As verbs, then, these P-based structure are necessarily transitive. And this is the simplest structure, here, since an intransitive counterpart would have to be derived:

(66) The Components of Location and Locatum Verbs:



This tells us that the basic structure of these verbs is transitive, but what prevents them from detransitivizing by zero derivation, as in the ungrammatical sentences of (65)? The answer, it seems to us, involves a natural extension of (64) itself—if there is no evidence for a zero derivation process, it does not exist at all. So there is no detransitivization by zero derivation in English.

Berber presents a problem here, if what we have suggested about it is true. The evidence which exists for detransitivization there is the kind of evidence a linguist might use, but it is not the kind a learner is expected to use—i.e., it is the impossibility of *ss*-transitivization with verbs of the class represented by *rZem* 'open', a kind of negative evidence. Of course, the learner of Berber learns the verbs by hearing them, and this could, in principle, be the solution. But experience tells us that, in general, learners do not always have to hear both alternants of a verb to know where it belongs in the classification of predicators within the language being learned (cf., Pinker, 1989). Assuming this is true for children learning Berber, the problem is to understand how it is possible for them to correctly classify a given verb on the basis of partial evidence. By hypothesis, there must be some other evidence, some other property which is, so to speak, "visible" and which distinguishes the two classes of verbs. This is, in fact, the suggestion of Guerssel (1986), who attributes to the two classes different semantic properties, suggesting a subcategorical difference not unlike that which, to a significant extent, distinguishes the two types in O'dham. In that language, where the synchronic derivational history is visible, adjectival elements figure prominently in basic intransitives, while these elements are absent in the derivations of basic transitives, many of which resist synchronic subanalysis (though many show Uto-Aztecan derivational morphology). Thus, it is possible, in cases of the type postulated here for Berber, that the evidence for zero derivation from transitive to intransitive is categorial. This is analogous to what we propose for English location and locatum verbs—the categories of the head and complement of the inner dyadic structure require that the verbal projection be transitive in the default case, i.e., where no other factor requires that the projection be other than transitive.

4. Unergative verbs.

We conclude this discussion with a brief return to the simplest of all argument structure types, i.e., that represented by (1) and (2) above and, in particular, their “monomorphemic” (conflated) counterparts in (12) and (13b), repeated here as (67) and (68):

- (67) English Unergative Verbs:
belch, burp, cough, crawl, cry, dance, gallup, gleam, glitter, glow, hop, jump, laugh, leap, limp, nap, run, scream, shout, sleep, skip, sneeze, sob, somersault, sparkle, speak, stagger, sweat, talk, trot, twinkle, walk, yell.
- (68) The children laughed.
*The clown laughed the children.
(i.e., the children laughed because of the clown)

These are generally viewed as intransitive (cf., Burzio, 1981). A prominent property which they exhibit is their inability to transitive in the manner which is “automatic” in the present framework, a property which they share with their transitive counterparts—cf. (13a), repeated here as (69):

- (69) The cowboys made trouble.
*The beer made the cowboys trouble.
(i.e., the cowboys made trouble because of the beer)

The explanation is the same in both cases, on the assumption that they share the same simple lp-monic structure (where the head is verbal, and the complement, X, is nominal):

- (70) The Unergative Structure:
- $$\begin{array}{c} V \\ \wedge \\ V \quad X \end{array}$$

The sentential subject is external, not a part of the lexical projection itself. It is necessarily external because the verb does not project a specifier, a general property of the category V, except where other factors force it to project a specifier, as in the composite dyadic type (where the complement requires that a specifier position be projected).

The cross-linguistic expectations are generally fulfilled, in part at least. And again, the translation equivalence is rather striking, as illustrated here for English, Miskitu, and Navajo:

(71) Verbs which do not alternate:

<i>English</i>	<i>Miskitu</i>	<i>Navajo</i>
cry	in-	-cha
cough	kuhb-	di-l-kos
laugh	kik-	ghi-dloh
play	pul-	na-né
shout	win-	di-l-ghosh
sing	aiwan-	ho-taaf
sleep	yap-	'-ł-ghosh
snore	kratw-	'-ł-gháá'

If the Miskitu and Navajo verbs of (71), as well as the English verbs in that set, are assigned the structure (70), then we can explain their failure to transitivity (in the “automatic” sense, setting aside the true causative which is possible for most)—the lexical projection has no specifier, hence no sentential syntactic object can appear in a hypothetical derived transitive. As linguists, we can assign these verbs to the lp-monadic type on the basis of their behavior. But here too there is a learnability problem—how does the learner assign verbs to this class? In English, there is more than a tendency for these verbs to be denominal. If X in (70) is nominal, then then the proper classification is clear. The verbs must be lp-monadic, i.e., unergative, because neither V nor N projects a specifier. But what about other languages? Is the denominal nature of these verbs sufficient to permit unerringly the proper classification? It is in fact true that that non-alternating verbs in many languages are based on roots belonging morphosyntactically to the category N. To some extent, this is true of Navajo, at least it is true that some non-alternating verbs in Navajo have stems which are “cognate” with morphosyntactic nouns (bracketed pages from Young, Morgan, and Midgette, 1992):

(72) Nominal etymologies for some Navajo Unergatives:

V		N	
ghi-dloh	'laugh'	dlo	[156]
'-ł-wosh	'sleep'	-wosh (< -ghosh)	[660]
di-yih	'breathe'	-yih (<-ghih)	[702]
'-yol	'inhale'	-yol	[723, 728]
di-za'	'belch'	-za'	[731]
di-zheeh	'spit'	-zhéé'	[770]

And in many languages unergatives are verb-noun compounds (i.e., overtly reflect incorporation) or “light verb constructions” (overtly reflecting the basic configuration without incorporation). In the Tanoan languages, for example, verbs corresponding to the English unergatives *work*, *speak*, *whistle*, *laugh*, *cry*, *sing*, and others, are overtly noun-based, taking the form of N-V compounds:

- (73) Some Tanoan Unergatives:
sae-'a (work-do),
se-'a (speech-do),
t_iu-'a (whistle-do),
h_iiil-'a (laugh-do),
shil-'a (cry-do),
zaae-'a (song-do).

And Basque uses the light verb structure [_vN V] overtly in the sentential syntax projected by lexical items corresponding to verbs of the non-alternating type, the verbal component being *egin* 'do', as in Tanoan:

- (74) Some Basque Unergatives:
- | | | | |
|-----|----------|------|---------|
| (a) | negar | egin | 'cry' |
| (b) | eztul | egin | 'cough' |
| (c) | barre | egin | 'laugh' |
| (d) | jolas | egin | 'play' |
| (e) | oihu | egin | 'shout' |
| (f) | lo | egin | 'sleep' |
| (g) | zurrunga | egin | 'snore' |

This is all very well, and indicative in some sense. But we cannot blithely assume that you can recognize an unergative by its form in all cases, or in all languages. In Miskitu, for example, there is no obvious nominal source for unergatives. To be sure, they contrast with the alternating verbs in lacking the intransitivity markers *-k-* and *-w-*, by and large, but the final /w/ of *kratw-* 'snore' may well be the intransitive marker. A subset of Miskitu unergatives, generally verbs of noise production (cf., *kuhb-* 'cough') are marked by means of an element *-b-*, in the same morphological position as the transitivity markers in the alternating set; but this holds only of a subset of unergatives.

5. Final remark.

Morphology and category are inconsistent guides to the arguments structure type of verbs, except when they are fully explicit. When they *are* fully explicit, however, they are quite generally consistent with the argument structure typology which is determined by (a) the two structural relations, complement and specifier, which obtain in argument structure configurations and define the elemental structures of (11) above, and (b) the default, or natural, categorial realizations of the nuclear elements which project lexical argument structures, on the one hand, and their arguments, on the other.

But these things are not always explicit, and we must assume that there is something else which is strongly at work in determining the ability of a language learner to type the verbs of his or her language properly. While meaning, in the sense of translation or paraphrase, is not reliable, this cannot be taken to imply that meaning *itself* is not reliable, or even *infallible*. It would be very difficult to argue against the view that "if we know the meaning of a verb, we know its

syntactic properties". This is essentially the Universal Alignment Hypothesis (Perlmutter, 1978), and it is at the heart of the Uniformity of Theta Assignment Hypothesis (Baker, 1988). We assume that the language learner uses the structures of (11), together with associated nuclear elements, to *name* concepts which exist, or can be formed, in an intellectual domain which, like language itself, is part of the human biological heritage and, further, that the relation between a concept and its name is principled and regular (cf. Jackendoff, 1983, 1990; and Carter, 1988). The observed limits on argument structure, mentioned at various points in this discussion, are explained in part by the fact that just two structural relations are expressed in the projection of argument structure configurations. The full explanation will require, among other things, an examination of how lexical items function in sentential syntax and, therefore, a study of their extended projections by functional categories.

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