THE LIMITS OF ARGUMENT STRUCTURE

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1. Introduction[1]

For several years we have been trying to understand why the argument structures of verbs, in all languages evidently, are relatively impoverished in diversity and syntactic complexity, by contrast to sentences, whose potential complexity is essentially without limit (cf. Grimshaw 1990; Hale and Keyser 1994). Only rarely does the complexity of a verb exceed that of English *put* or *give*. We believe that the explanation for this limitation is to be found partly in the fundamental nature of the lexical categories, or parts of speech, and partly in certain basic principles according to which syntactic structure is "projected" from lexical items. We will suggest what these factors are presently, after a brief review of some of their effects.

2. Some elementary observations

In English, so-called "unergative" verbs have the characteristic that they lack the transitivity alternation which would otherwise permit not only (1a) below, but also (1b):

(1) (a) The colt sneezed.   (b) *The alfalfa sneezed the colt.

In this, unergatives differ from "ergative" verbs like *break,* and *clear,* which have both transitive and intransitive uses. We assume that the basic lexical representation of unergatives is identical to that of expressions of the type represented by *make trouble,* exemplified in (2a) below, and we assume further that the ill-formedness of (1b) is due to the same factor as that which gives rise to the ill-formedness of (2b):

(2) (a) John made trouble (because of the rum he drank).
     (b) *The rum he drank made John trouble.
   (Cf. The rum caused John to make trouble.)

The argument structure shared by the verbs of (1a) and (2a) corresponds to the verbal projection depicted in (3). The verb takes a nominal complement, as shown. In the case of (1a), the verbal head is initially empty, deriving its surface phonological form through "incorporation" of its nominal complement *sneeze*. By contrast, the verb of (2a) is phonologically constituted; its nominal complement, therefore, does not incorporate and, instead, develops a complete DP projection —and this satisfies the Case Filter in the usual way, as required, once the verbal projection itself combines with appropriate functional categories in sentential syntax.

(3)   V
          /\
         V   N
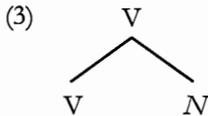
Given (3), the question raised by the data of (1) and (2) can be reformulated in terms of the grammatical relation subject, an argument absent from (3). The apparent subjects in (1a) and (2a) are *external* to the lexical argument structure. If the verb of (3) projected an internal specifier (i.e., subject) position, we would expect (1b) and (2b) to be perfectly grammatical, on the analogy with *clear,* as in (4a, b):

(4) (a) The screen cleared.   (b) I cleared the screen.

In (4), the lexical projection involves a verbal head, as before. Its complement, however, is an adjective, not a noun. In addition, an internal specifier is projected, as shown in (5), the lexical structure assumed for *clear* above:

(5)   V
          /\
       (V)   V
             /\
            N   V
                /\
               V   A
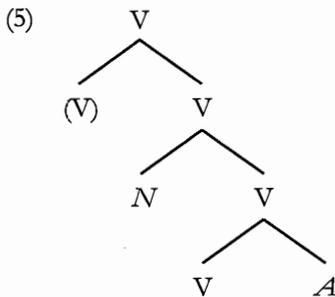
The inner structure of (5) represents the basic lexical configuration defined by the intransitive de-adjectival verb *clear,* exemplified in (4a). The verb itself is derived by incorporation, just as in the case of denominal unergatives. But in this case, the verb projects a subject position. The basic verb can combine with a higher empty verb, as indicated parenthetically in (5), giving the transitive form exemplified by (4b). The question we are left with is this: Why can't an unergative verb project a

subject and transitivize in the same way? In other words, why is (6), the hypothetical lexical structure underlying (1b), impossible? This is the proper form of our question, given our assumptions.

(6)   *(V)
          /   \
      (V)   V
              /   \
           N   V
                   / \
                  V   N
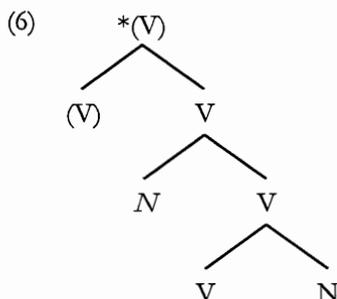
The subject of an intransitive ergative (i.e., inchoative) verb is an *internal* subject, while the subject of an unergative is *external.* That is the upshot of the observations just made.
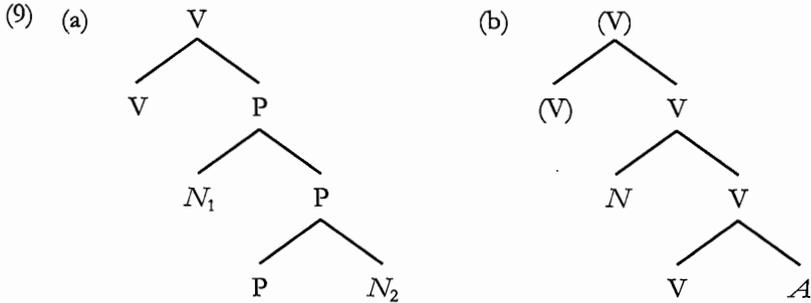
In neither case can a subject incorporate into the verb and leave the complement to project to the phrasal level. Thus, for example, assuming verbs of animal birthing (like *calve, pup, foal*) are unergatives, the verb of (7a) below is perfectly possible, being derived through incorporation of its complement. But the verbs of (7b, c), with the subject incorporated, are impossible. This is understandable, of course, given that the subject of an unergative is external and, therefore, not "visible" to the verb. But visibility is irrelevant, in fact, since an internal subject is also impossible to incorporate, as the ill-formedness of (7e) demonstrates:

(7) (a) A cow calved.   (d) A screen cleared.
     (b) *A calf cowed.   (e) *It screened clear.
     (c) *It cowed a calf.

This further limitation on the variability of argument structures must be explained by an adequate theory of the lexicon, of course, and our expectation is that it will follow from the inherent properties of the lexical categories and the basic principles of syntactic projection.

If location and locatum verbs, like those of (8a, c) below, and de-adjectival verbs, like that of (8f), are derived by incorporation, the process is successive incorporation into immediately governing heads. Thus, N_2 of (9a) incorporates first into P and the resulting compound then incorporates into V. Similarly, A of (9b) incorporates first into its sister V. The result then raises to the upper V. What is impossible is incorporation from the specifier (N_1 of (9a), or N of (9b)) into the upper V, as attested by the ungrammaticality of (8b) and (8e), in which the incorporated nominals *apple* and *house* originate in the specifier position re-presented by N_1 in (9a), and by the ungrammaticality of (8g) in which the putative source of the denominal verb *spear* originates in the position corresponding to N.

(8) (a) They put the apples in a box/boxed the apples.
     (b) *They appled in the box.   (c) They painted the house.
     (d) He gave the house a coat of paint. (f) He straightened a spear.
     (e) *He housed (with) a coat of paint. (g) *He speared straight.

(9) (a)   V   (b)   (V)
           ╱   ╲   ╱   ╲
          V   P   (V)   V
               ╱   ╲   ╱   ╲
             N_1 P   N   V
                  ╱   ╲   ╱   ╲
                 P N_2 V   A

In short, incorporation of the type under consideration here is from the complement position, never from a specifier position. Here again, we have a limitation on possible argument structures, and it is reasonable to expect that it will be explained by reference to properties inherent in the categories and by reference to the principles according to which the categories project in syntax.

The structures of (9) are relevant also to the problem represented by the sentences of (10). Denominal location and locatum verbs are limited to the transitive use—hence the ill-formedness of (10b, d). De-adjectival verbs, on the other hand, can be either transitive or intransitive, as in (10e, f):

(10) (a) She corraled her horses.   (b) *Her horses corraled.
      (c) She saddled Zebra Dun in the morning.
      (d) *Zebra Dun saddled in the morning.
      (e) He cleared the screen.   (f) The screen cleared.

The central disparity observed here follows, in fact, from the structures assigned in (9). In (9a), the lowest V is above the internal subject, or specifier, while in (9b), the lowest V is beneath the internal subject. Assuming that this arrangement corresponds to structural relations persisting in sentential syntax, verbs whose structure corresponds to (9a) will necessarily be transitive, since the verb will necessarily assign case to the internal subject (surface object). By contrast, verbs whose lexical structure corresponds to (9b) will be intransitive if the higher V does not appear, transitive if it does (a free option). However, if the transitivity contrast follows from the structures assigned, we still face an explanatory task —namely, that of explaining *why* denominal and de-adjectival verbs have the structures they do, rather than having entirely parallel structures (as assumed in Hale and Keyser 1994, for example).

3. Toward a theory of argument structure

If the problems we have discussed here are due to the nature of the elements involved, i.e., to the properties inherent in the lexical categories, what *are* these

properties and how do they determine the observed limits on argument structure? We propose that the properties relevant here are defined in terms of the syntactic relations "subject" and "complement", corresponding to the two dimensions arrayed in (11) below:

(11)   The Lexical Categories:

	+ subject	− subject
+ complement	"P"	"V"
− complement	"A"	"N"

The informal "feature" notation employed here is intended to evoke the structural properties of the four categories defined. Thus, for example, the notation [+complement] corresponds to the structural fact that a lexical head so defined necessarily combines with another category which stands in the structural relation "immediate sister" to it —as in the structure depicted in (3) above, in which N stands in the complement (i.e., structural sister) relation to the head V. A formal representation of the [+complement] feature would be the structure itself. The notation [+subject] attached to a head is similarly structural. It is the relation which holds between a subject and a predicate; a head associated with the feature [+subject] projects a predicate and must, therefore, have a subject —as exemplified, for example, in (5), where N is the subject of the predicate A, and in (9a), where N_1 is the subject of the predicate formed by P and its complement N_2.

Within the cells of (11), we have included the traditional part-of-speech labels —in quotes, to reflect the fact that the correspondence between the traditional categories and the universal ones is not necessarily exact. In the system of universal lexical categories, putatively embodied is (11), there is a lexical category whose members do not take complements and, at the same time, are *predicates* (i.e., necessarily take a subject). This category is universal, we insist, but it is variously realized in the actual morpholexical categories of the world's languages. Thus, for example, this category is realized in English by the class of elements traditionally called "adjectives". But this morpholexical class, though recognized as distinct and coherent in many languages, is far from universal as a separate morpholexical category in languages generally. In many languages, the universal [−complement, +subject] category is realized by members of the class traditionally called "verbs", and in some, it is realized by members of the class "noun". In general, in what follows, when we use the term "adjective" or "A" in a technical sense, we will be referring to the *universal category* defined by the intersection of the properties [−complement] and [+subject], which may or may not correspond to a coherent and distinct morpholexical category of English or any other language. We also use the term in the traditional way, i.e., to refer to the morpholexical category, hoping that the ambiguity will not result in confusion. The same usage will hold for the other categories as well. Thus, we must say of Warlpiri, for example, that it has adjectives, in the technical or universal sense; and at the same time, it does *not* have adjectives in the traditional sense —adjectives in the technical sense are nouns in the tradi-

tional sense (i.e., they are nouns in Warlpiri morpholexical realization; cf. Simpson 1991). And we must say of Navajo, that it has adjectives in the universal sense, but these are realized morpholexically as verbs (cf. Young and Morgan 1987).

From these considerations, it follows that when we observe that a particular English adjective "takes a complement", as in *proud of one's children,* for example, we must assume that it is not an adjective in the universal sense, given the classification in (11). To determine its universal classification, we must examine its properties. We must determine whether the apparent complement is in fact a complement at the lexical representation. If it is, then we must determine whether the item is a verb or a preposition, the two relevant candidates.[2] It is not our purpose here to determine individual cases of correspondence disparity but merely to indicate that there are disparities and to assert that our primary focus is the universal system of lexical categories —these are, in and of themselves, un-ambiguous and clear, though the issue is often clouded by morpholexical factors of individual languages.[3]

Let us return now to the problem of explaining limitations on argument structure. In this connection, we first state, informally, two "principles" which are observed in the syntactic projection of lexical argument structure:

(12) Principles of Projection:
      (a) Full Interpretation.
      (b) Asymmetry (if A c-commands B, where A and B are at same level of projection, then B does not c-command A).

We suspect that these are derivative of the properties of the lexical categories, as set out in (11). For present purposes, however, we will treat the Principles of Projection as autonomous —(12a) requires that any maximal projection properly included in a lexical entry (i.e., dominated by a root lexical projection, verb, noun, etc.) be a subject or a complement; and (12b) requires sister relations to be binary.

4. Empirical consequences

With this background, we can suggest explanations for the restrictions on argument structure so far noted.

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(2) This requires determining whether it takes an internal subject —the ill-formedness of *it prided/prouded her of her children* suggests, initially, at least, that *proud* is not a preposition, in the universal sense (see Hale and Keyser 1993, for discussion of related cases, i.e., unergatives and transitives). Thus, the conclusion, so far, is that it is a verb, in the universal sense. This is a tentative conclusion, however, since a number of factors not touched on here must be taken into consideration in reaching a final conclusion.

(3) It should be pointed out, of course, that the correspondence between universal and morpholexical categories, while not exact, is nonetheless quite regular. This can be seen by the relative success of "notional" principles of correspondence. Thus, "dynamic events" are normally verbs in both universal and morpholexical senses; "entity expressions" are normally nouns in both senses, and "birelationals" are typically adpositions (or semantic cases). The regularity is apparent also in cases of the type represented by Navajo and Warlpiri. "Attribute expressions" are quite consistently verbs and nouns, in the two languages respectively, with little if any deviation from these correspondence principles.

4.1. Unergatives have no causative alternant

Consider first the limitation on unergative structures of the type represented by (1) and (2). Whether "synthetic", as *sneeze* in (1a), or "analytic", as *make trouble* in (2a), unergatives share the lexical structure depicted in (3), consisting of a verb (V) and its complement, a nominal (N). The lexical structure of unergatives explains the ill-formedness of the causatives in (1b) and (2b). First, a noun is not a predicate (i.e., it is [–subject] in our informal feature notation), and therefore does not license a subject. And the verb (also [–subject], by hypothesis) likewise fails to license a subject, internal to the lexical projection.[4] Consequently, an unergative verb has no internal subject lexically and, consequently, cannot appear as the subordinate verb in the structure depicted in (6), the structure that would be required in the causative, as in the failed causatives (1b) and (2b). The structure of (6) violates the principle of Full Interpretation (i.e., (12a)), since the nominal occupying the inner specifier position is uninterpretable—it cannot function as a subject, there being no predicate in the structurally appropriate position; nor can it function as a complement, obviously. No such violation occurs in (5), of course, since the subordinate verb there takes an adjectival complement; an adjective requires a subject and therefore licenses the nominal N appearing in the specifier position projected by the verbal head. It follows, then, that both intransitive and transitive ("causative") alternants of de-adjectival verbs, like *clear* in (4a, b), are generally possible in English. The intransitive alternant lacks the upper (parenthetic) verb of (5), while the transitive includes that verb. The subject of the intransitive originates in the specifier position projected by the lower verb, while in the transitive alternate that position corresponds to the sentential syntactic object of the transitive verb. The subject of the transitive is external, being base generated in a position appropriate for predication (e.g., subject of a verbal small clause, or specifier projected by a locally c-commanding functional head, such as T(ense)).

4.2. On the nature of empty heads

We believe that the principle of Full Interpretation is also implicated in the ill-formed verbs of (7) and (8). In this instance, what is at issue is the fundamental nature of empty heads (e.g., empty V and P), assumed to be present at the initial representation of denominal and de-adjectival verbs of the type represented there. Consider first the simplest case, that of unergatives like *sneeze* and *calve* in (1a) and (7a). According to our view of this type, their lexical representation is abstractly that given in (3), where V represents an "empty" verb and N represents an overt noun

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(4) In "sentential syntax", of course, a verb is the *prototypical* predicator and all verbs are inherently capable of taking subjects there, whether raised from an *internal* position, in the case of unaccusatives, or base-generated in *external* position, in the case of unergatives and transitives. The capacity of a verbal projection to function as a predicate, we believe, is activated by an appropriate syntactic environment. This environment is most typically defined by the functional category T(ense), which assigns a "temporal reference", or T-value, to the verbal projection. Some lexical verbs may assign a T-value as well, as the verb *make* in the English causative construction —thus, the bare infinitive *leave* in *make John leave* functions as a predicate, licensing the subject *John*. By contrast, the verb *consider* does not assign a T-value to the verbal projection it governs— compare the ill-formed **consider John speak Spanish*, with a (bare infinitival) verbal small clause complement, and the well-formed *consider John intelligent*, *consider the idea off the wall*, in which the small clause complements are headed by inherent predicators.

(*sneeze* and *calf,* in the examples under consideration). We must assume that the empty V here is not a "zero morpheme", in the sense of Myers (1984) and Pesetsky (1994), as it is crucially different from the kind of empty category which persists in the derivation of morphologically complex forms and into sentential syntactic representation of linguistic structures. Rather, we assume, an empty lexical head is uninterpretable at PF and, accordingly, must be eliminated from the representation of lexical items. The process which eliminates an empty head is the process which we have referred to as "incorporation", whose effect is to merge the phonological matrix of the overt complement with the empty phonological matrix of its governing sister, the host. This is not incorporation in the widely accepted sense (cf. Baker 1988), as it is driven entirely by phonology, the requirement that an empty lexical head be supplied with a phonological matrix and, thereby, to be interpreted at PF. However, we imagine that the precondition for the required merger of phonological matrices is head movement of the type generally associated with incorporation. Accordingly, a configuration of the sort pictured in (13) below presumably derives from the basic unergative structure (3), with N dominating the phonological matrix corresponding to the noun *sneeze* while V dominates the empty matrix [ ]:

(13)
```
              V
             / \
            V    t_n
           / \
          V   N
          |   |
         [ ] [sneeze]
```
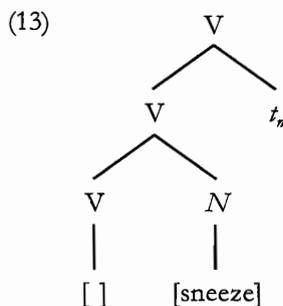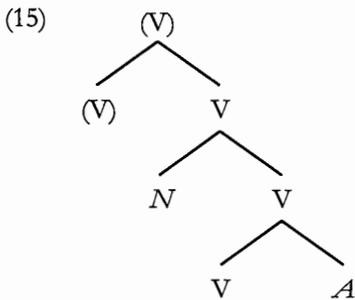
We imagine further that the merger of the resulting compounded (empty verbal and overt nominal) matrices into a single phonologically interpretable one —as in (14)— is automatic, so that the verb is no longer "empty" in the sense relevant to Full Interpretation at PF:

(14)
```
            V
           / \
          V    N
       [sneeze]
```
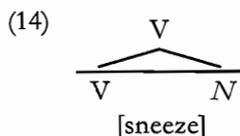
A crucial assumption here is that lexical items must satisfy Full Interpretation at PF, which means that "empty heads" must be absent from lexical representation at that level. We take this to mean that incorporation must take place instantly when an empty head is composed with its complement. From this, it follows at once that the subject of an unergative verb cannot incorporate, as in the ill-formed (1b), (2b), and (7b, c). Since an empty head must fill its phonological matrix immediately, it must do so from its complement. Its subject, an external

argument, is entirely out of play. The same is true in the case of de-adjectival verbs. In this case, the subject is internal to the lexical projection, but it is still out of consideration, since incorporation must be from the complement, not from the specifier, under the assumption that the phonological interpretation of empty heads is immediate.

The ill-formed sentences of (8) are to be explained in a similar way, given an appropriate additional assumption. Let us consider (8g) first; this is ill-formed on the interpretation according to which the sentence means 'he made the spear straight', or the like. The relevant structure, abstracting away from incorporation, is (9b), repeated here as (15):

(15)

```
            (V)
          /     \
       (V)        V
              /      \
            N          V
                     /   \
                    V      A
```

The hypothetical verb *spear* of (8g) is produced by incorporating N into the higher verb, an impossible incorporation. It is impossible because that verb must incorporate its *complement*. And its complement is not N but the lower V: The assumption required here is that head movement to a governing host verb is restricted to the *head* of the complement of that verb (cf. the Head Movement Constraint of Travis 1984, and Baker 1988). No other head is "visible" to the governing verb. Therefore, a proper derivation —yielding a sentence like (8f), with the de-adjectival verb *straighten*— necessarily procedes from the lowest verb-complement structure. Accordingly, V combines with its complement A:

(16)

```
         V
       /   \
      V      A
      |      |
     [ ]   [straight]
```
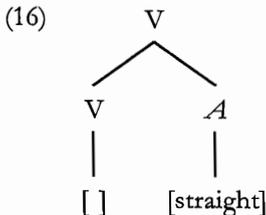
Being empty, V incoporates its complement, A, in order to fill its phonological matrix:[5]

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(5) We will have something to say at a later point about the suffixal morphology -*en* which appears on this and many other de-adjectival verbs of English; and similarly for the voicing alternation exemplified by nominal *calf* and verbal *calve* in (7a-c). For present purposes, we treat verbs like *straighten*, with an overt suffix, as being essentially the same in character as verbs like *clear*, which lack any derivational morphology. In both cases, an underlyingly empty matrix is required to be filled in order to satisfy the principle of Full Interpretation.

(17)

```
          V
        /   \
       V      t_a
      / \
     V   A
   [straight]
```
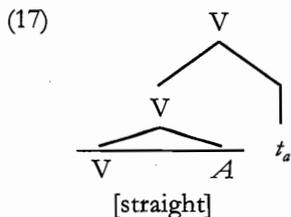
Since this verb has an adjectival complement, which requires a subject, it must project a specifier position so that predication can be expressed, guaranteeing that both N, functioning as the required subject, and A, represented now by the chain defined by head movement, satisfy the requirement of Full Interpretation:

(18)

```
            V
          /   \
         N      V
              /   \
             V      t_a
            / \
           V   A
         [straight]
```
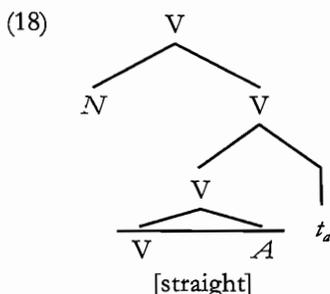
This is the argument structure of the intransitive *straighten*, as in *the spear (finally) straightened*, and in general this is the structure shared by intransitive de-adjectival verbs, like *clear* in (10f) above. The transitive alternant involves a higher empty V. The derived verb of (18), being phonologically overt, would be in the appropriate position to incorporate into a higher empty verb sister to it (i.e., sister to its maximal projection) —corresponding to the parenthesized matrix verb of (15). The phonological matrix of this higher verb would then be filled, by virtue of incorporation, giving (19), and thereby satisfying the Principle of Full Interpretation:[6]

(19)

```
              V
            /   \
           V      V
          / \    / \
         V   A  N   V
       [straight]  / \
                  t_y  t_a
```
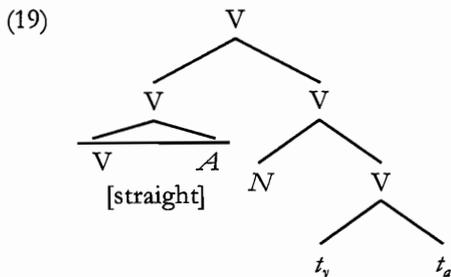
(6) This structure is less complex than it should be on the view that incorporation is a kind of adjunction. We assume that the overt verb simply substitutes for the empty verb in this case, giving the structure pictured in (19), without an additional "adjunction structure". This "pruning" effect may simply be the natural outcome of "incorporation as *substitution*", as opposed to adjunction (cf. Chomsky 1994). Other conceptions of derived transitives are possible, of course, and the abbreviatory practice adopted here may have to be abandoned, particularly when the semantic consequences of the transitivity alternation are fully considered.

The argument structure of transitive *straighten,* i.e., (19), has the verb in the raised position required for accusative Case assignment to N in sentential syntax. By hypothesis, the higher verb, now overt, takes a verbal complement, dominating t_{v}. Since the latter is not a predicate (cf. (11) above, where the category "V" is [–subject]), it does not license the higher verb itself to project a specifier. Accordingly, the subject of transitive *straighten,* and of all transitive de-adjectivals, is external and therefore required in sentential syntax but absent in the lexical projection of argument structure.

Returning now to (8g), the argument structure exemplified there is impossible, we maintain, because the only conceivable derivation of a transitive verb like *straighten* is that according to which the higher verb incorporates its *complement,* as in (19), i.e., the argument structure of the verb of the well-formed (8f). The internal subject, N, is not the complement of the higher verb —it is therefore not visible to the higher verb and is bypassed in the process of incorporation. The ill-formed argument structures of (8b) and (8e) receive a parallel explanation. For present purposes, we will consider just (8b), repeated here as (20):

(20)   *They appled in the box.
       (In the sense: "they put apples in the box", "they boxed apples".)

The relevant abstract representation of the argument structure relations here is as in (9a), repeated as (21), in which V is empty, N_1 corresponds to the noun *apple* and the prepositional constituent following that noun corresponds to the phrase *in the box:*

(21)

$$
\begin{array}{c}
V \\
\diagdown \\
V \quad P \\
\diagdown \\
N_1 \quad P \\
\diagdown \\
P \quad N_2
\end{array}
$$
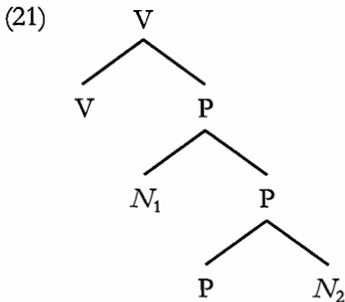
The derivation which gives rise to (20) above is illicit, for the reasons just discussed. That sentence is presumably derived by incorporating the noun *apple* into the matrix V. However, N_1 *(apple)* is the subject of the prepositional predicate (i.e., the "internal" subject of the verb); it is not the complement of the verb. The only possible verb-forming derivation here is that in which P, the true complement of V, incorporates to give the latter overt phonological realization. It happens, of course, that English does not freely incorporate overt prepositions (unlike languages of the type discussed in Craig and Hale 1988, for example), so there is no possible derivation based on the structure underlying (8b) —hence, also, *they inned apples the box.* However, (21) does correspond to a highly productive lexical type in English,

namely, the location and locatum verbs (cf., for example, (10a) and (10c) above, and (22) below).

The denominal location verb *box*, as in (22) represents the class whose members have the argument structure (21), with the overt noun *(box,* in this instance) in the position corresponding to N_2, with V and P empty, and N_1 an argument variable fully realized as a nominal expression in sentential syntax *(the apples* in this instance).

(22) They boxed the apples.

The empty P will, of course, require incorporation to satify Full Interpretation at PF—that is to say, P must incorporate its complement N_2, *box*. And the empty V must likewise incorporate its complement, P. We understand this to mean that V incorporates the head of the P projection. This, in the example at hand, now has the form $[_p P \ [_N box]]$, order immaterial, by virtue of the incorporation of *box* into the once empty P. This complex is phonologically overt and, accordingly, satisfies Full Interpretation, not only in relation to the empty P, but in relation to the empty V as well, once incorporation takes place there —in both cases, an empty phonological matrix is eliminated through merger with the matrix associated with the noun *box*.

4.3. Transitivity alternations

The sentences of (10) above exemplify an asymmetry distinguishing the class of de-adjectival verbs, like *clear, narrow, straighten,* from the class comprised of the locatum and location verbs, like *saddle, salt, shelve, box,* Members of the former class have both intransitive (inchoative) and transitive (causative) forms, as in (23a, b):

(23) (a) The broth thickened.   (b) The cook thickened the broth.

But members of the second set are transitive only:

(24) (a) She harnessed the mules.   (25) (a) He crated the pears.
      (b) *The mules harnessed.   (b) *The pears crated.

This distinction follows, given a certain auxiliary assumption, if we take (9a, b), repeated here as (26a, b), to be the relevant lexical argument structure representations:


(26) (a) / (b) — tree diagrams
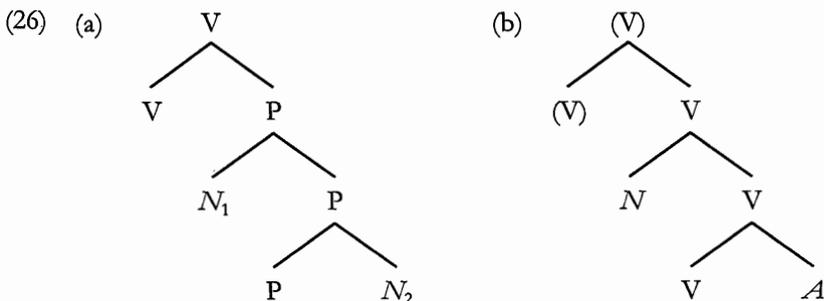
In the argument structure associated with locatum and location verbs, i.e., (26a), the internal subject N_1 is c-commanded by the verb of the construction. If we make

the assumption that this arrangement persists into sentential syntax, then we account for the consistent transitivity of these verbs, since the internal subject is in the canonically Case-marked position in relation to the verb —it is, in fact, in an object position in sentential syntax, being minimally c-commanded by the verb. De-adjectival verbs, on the other hand, are associated with the argument structure depicted in (26b), with the internal subject in a position superior to that of the relevant (lower) verb of the configuration —i.e., N is outside the c-command domain of the verb there and, therefore, it "escapes" accusative case marking. Other things being equal, the internal subject will raise to an appropriate functional specifier position and there assume the role of sentential syntactic subject. To be sure, if the intransitive structure appears as the complement of a higher V, parenthetic in (26b), the internal subject will appear as an object in sentential syntax, as in (23b).

This is an account of the transitivity asymmetry, but it is not an explanation. The transitivity facts follow from the *structures* attributed to the two classes of verbs. We ask now whether there is a reason for these structural assignments. Do they follow from fundamental properties of the categories, for example? We think they do.

Consider first the class of de-adjectival verbs. According to (11) above, adjectives are predicates and they do not take complements —this is what distinguishes them from the other categories, and this is what accounts for the structures in which they can appear. An adjective, being a predicate, must take a subject. But its subject cannot appear *within* the adjectival projection itself, as in (27), since the configuration this would imply —with N sister to A° within the A projection— is that of a head and its *complement,* and adjectives do not take complements, by hypothesis:[7]

(27)

```
        A
       / \
      A   N
```
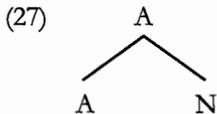
Therefore, the adjective must find its subject in the specifier of the higher category which governs it. Here, the relevant higher category is the verb which selects the adjective as its complement. The configuration which this suggests is (28):

(28)

```
        V
       / \
      N   V
         / \
        V   A
```
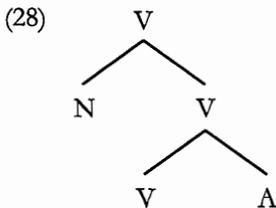
This is the prototypical intransitive structure associated with the class of so-called "unaccusative" verbs —it corresponds to the inner verbal projection of (26b)

---

(7) We are assuming here that there is no autonomous "specifier" position. A specifier position is present only if the head of the relevant construction combines with a complement (cf. Chomsky 1994) for a related conception of syntactic projections.

above, in which the principal verb is lower in the structure than the internal subject. The transitive variant, of course, results when another, higher verb selects the unaccusative. This accounts for the transitivity alternation which characterizes de-adjectival verbs in general. The alternation, or at least the existence of an intransitive variant, follows directly from the essential nature of the category A.

Prepositions, by contrast, take complements and form predicates. This means, we assume, that their subject can be internal to their own projections. In fact, since this is a matter of *projection*, it is perhaps necessarily the case that the category P, once it combines with its obligatory complement (N_2), projects a specifier position (N_1) to satisfy the subject requirement:

(29)

```
            P
          /   \
       N₁       P
              /   \
            P       N₂
```
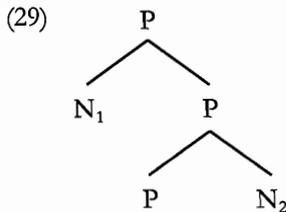
This is, so to speak, a "lexical small clause" headed by P. The corresponding derived verb involves the slightly more complex structure (26a), of course. Where the V is empty in (26a), it will incorporate its complement P (itself a complex head resulting from the incorporation of N_2). Since N of (26a) is in the canonical object position (in sentential syntax), the verbs involving this structure will be transitive, assuming of course that the configuration (26a) persists —and we maintain that it does. If this is correct, then it follows from the essential nature of the category P, which permits, and requires, its subject to appear *within* its own categorial projection and therefore in the c-command domain of the verbal head.

5. Overt derivational morphology

In English, an extraordinarily large number of derived verbs belong to the type sometimes said to involve "zero derivation", i.e., unassociated with overt derivational morphology. Most denominal verbs fit this description, the derived verb being phonologically identical to the putative source noun, e.g., *box, corral, bottle, saddle, harness,* and so on. Some de-adjectival verbs are likewise of this type, e.g., *clear, narrow,* and *thin.* This observation accords well with the idea that incorporation is motivated by the very fact that the verb is basically empty, i.e., is associated with an empty phonological matrix. Incorporation is required in order to satisfy the Full Interpretation requirement.

The situation is not entirely straightforward, however, since many denominal and de-adjectival verbs involve what appears to be overt derivational morphology, most prominently, perhaps, the prefix *en-,* the suffix *-en,* or both, as in *encase, enlarge, thicken,* and *embolden.* Let us suppose that *overt* affixal derivational morphology involved in the projection of lexical argument structures such as these implicates the very principle of Full Interpretation which drives the process of incorporation in the

derivation of verbs from phonologically *empty* verbs. Suppose, for example, that a lexical derivational prefix, like English *en-*, consists not merely of the segmental representation (plus, perhaps, a hyphen to represent its prefixal status) but rather of the overt morpheme *in combination with* an empty phonological matrix [ ] to its right; correspondingly, a derivational suffix consists in an overt morpheme in combination with an empty matrix to its left (cf. Keyser and Roeper 1984):

(30)   (a)   en[ ].   (b)   [ ]en.

Accordingly, the derived verbs of (8f) and (23b), *straighten* and *thicken,* are not, as implied heretofore, based on underlyingly empty verbs, strictly speaking, but rather on verbs of the form depicted in (30b). However, we maintain, verbs of this form enforce incorporation in the same sense as before, since the empty matrix must be realized phonologically in order to satisfy the principle of Full Interpretation.

In the following subsections, we consider a language in which most derived verbs involve overt derivational morphology, i.e., 'O'odham —Pima and Papago of southern Arizona and northern Sonora (cf. Zepeda 1984). Our purpose in this is a limited comparative one of assessing the extent to which derived verbs in 'O'odham conform to the principles which appear to limit derived lexical argument structures in languages like English, in which "zero-derivation" is prominent. If the suggested principles are replicated here, then we have some limited indication that they are in force generally in limiting lexical argument structures, derivations, and diathesis alternations.

5.1. 'O'odham derived verbs

In this subsection, we exemplify a small set of 'O'odham derived verb types which appear to us to be relevant to the question at issue, leaving theoretical discussion for 5.2. We begin with verbs of manufacture and creation.

(31)   Derived verbs of production:
       (a)   *ki:* 'house'   *ki:t* 'build a house'   *ki:cud* 'build × a house'
       (b)   *hoa* 'basket'   *hoat* 'make a basket'   *hoacud* 'make × a basket'
       (c)   *ga:t* 'bow'   *ga:t* 'make a bow'   *ga:cud* 'make × a bow'

In the usage of interest here, verbs of the type represented by *ki:t* 'build a house' are syntactically "intransitive" in the sense that they normally take a subject, and no object. They are transparently formed from nouns, and it is natural to assume that they are derived by incorporation, the suffix *-t* being the surface reflex of a verb —'make, build'— which incorporates its underlying object. This idea is encouraged somewhat by the observation that a "floated" quantifier associated with the incorporated noun may appear —stranded, so to speak, in the process:

(32)   'A:ñi   'ant   o   hema   ki:-t.
       I   AUX1   FUT   one   house-MAKE.
       'I am going to build a house'.

Verbs of the type represented by *ki:cud* 'build × a house' are, syntactically speaking, transitive. Their syntactic object, represented in the gloss by the variable *x,*

corresponds to the semantic relation "recipient" or "beneficiary". As in the case of the simpler verbs of manufacture, incorporation of an underlying direct object (semantic "theme") is suggested —the "floated" quantifier *hema* 'one' is possible here as well. The meanings of the two verb forms —e.g., the simple verb of manufacture *ki:t* and the corresponding benefactive or applicative *ki:cud*— are related in an entirely regular way. With verbs of the second type, the recipient or beneficiary argument (the syntactic object) is represented not only by an appropriate nominal phrase but also by object agreement (*ha-* in this case):[8]

(33) 'A:ñi 'ant   o   hema   ha-ki:-c   g   'a'al.
      I   AUX1   FUT   one   3p-house-BEN   ART   children.
      'I am going to build the children a house'.

The derivational suffix appearing in the verb of (33) is identical in form to the causative of (34a-c), which shares the causative derivational function with the suffix *-id* of (34d-f):

(34) Causatives:
      (a) *mer*   'run (e.g., car)'   *melcud*   'make x run, drive x (car)'.
      (b) *him*   'move'   *himcud*   'make x move'.
      (c) *heum*   'get cold'   *heumcud*   'make x cold'.
      (d) *cexaj*   'rise'   *cexajid*   'raise x, lift x'.
      (e) *huruñ*   'descend'   *huruñid*   'lower x'.
      (f) *ha:g*   'melt'   *ha:gid*   'melt x'.

In contemporary 'O'odham, the two ending exemplified here (*-cud* and *-id*) are the principal ones involved in deriving the transitive (or "causative") form of a verb —the choice between them is now essentially a lexical matter. The two verb forms differ in the expected way— the subject (semantic "theme") of the intransitive corresponds to the object of the transitive; and the external (subject) argument of the transitive is typically an "agent":

(35) Ma:gina   'o   mer.
      car   AUX3   run.
      'The car runs/is running'.

(36) 'A:ñi   'ant   o   mel-c   g   ma:gina.
      I   AUX1   FUT   run-CAUS   ART   car.
      'I am going to run/drive the car'.

Somewhat different morphology is involved in deriving active verbs from statives (or adjectives):

(8) The loss of final [ud] from the verb ([ki:cud] → [ki:c]) is by perfective truncation, a standard feature of regular verbs in 'O'odham, affecting as well the other causative ending *-id*, other derivational suffixes, and basic verbal roots. In reality, it is believed, truncation is deletion of a final underlying CV, the vowel preceding this being reduced or deleted through the operation of another process. See Hill and Zepeda (1992) for a discussion of truncation and "demoraicization".

The orthography employed in 'O'odham examples here departs from the official usage in two respects, for typographic convenience: the apico-alveolar (slightly retroflexed) stop is represented by /r/, the Tepiman ancestral form, and the retroflexed apico-domal fricative is represented by /x/.

(37) Adjectives and de-adjectival verbs:

    (a) *wegï* 'red' *wegi* 'redden' *wegi(ji)d* 'redden x'.
    (b) *moik* 'soft' *moika* 'soften' *moika(ji)d* 'soften x'.
    (c) *ge'ej* 'big' *ge'eda* 'get big' *ge'eda(ji)d* 'enlarge x'.

The verbs of the second column are "inchoatives", while those of the third column are the corresponding transitives (or "causatives"); the subject of the inchoative corresponds to the object of the causative, as expected:

(38) Hogï   'o   s-moik.
    leather   AUX3   POS-soft.
    'The became soft'.

(39) Hogï   'at   moika.
    leather   AUX3   soften.
    'The leather became soft'

(40) 'A:ñi   'ant   o   moikad   g   hogï.
    I   AUX1   FUT   soften   ART   leather.
    'I will soften the leather'.

'O'odham also has derived locatum verbs, paralleling English verbs of the type represented by *saddle, salt,* etc.

(41) Locatum verbs:

    (a) *'on* 'salt' *'onmad* 'salt x, put salt on x'.
    (b) *hialwui* 'poison' *hialwuimad* 'put poison in/on x'.
    (c) *hogï* 'leather' *hogïmad* 'put leather on x'.
    (d) *si:l* 'saddle' *si:lrad* 'put a saddle on x, saddle x'.
    (e) *xu:xk* 'shoe' *xu:xkrad* 'put shoes on x, shoe x'.
    (f) *xa:kim* 'hackamore' *xa:kimrad* 'put a hackamore on x'.

The difference between these two derivational endings correlates with the nature of the nouns involved ——*mad* is for "materials", generally mass nouns, while *-rad* is for "individual entities", generally count nouns. The derived verb is transitive, with the syntactic object corresponding to the entity which, by virtue of the process denoted by the verb, comes to "have" or "be with" the material or entity denoted by the incorporated noun:

(42) 'A:ñi   'ant   o   'onmad   g   ñ-hugï.
    I   AUX1   FUT   salt   ART   my-food.
    'I'm going to salt my food'.

(43) Heg   'at   o   xu:xkrad   g   ñ-xoiga.
    he   AUX3   FUT   shoe   ART   my-pet.
    'He's going to shoe my horse'.

Our final example illustrates the use of the derivational suffixes *-cud* and *-id* (compare (34) above) in the formation of applicative, or benefactive, verbs:

(44) Applicative (benefactive) verbs:

    (a) *kawkad* 'harden x' *kawkadacud* 'harden x for y'.
    (b) *xelin* 'straighten x' *xelñid* 'straighten x for y'.

(c) *cu'a*   'grind x (e.g., corn)'   *cu'id*   'grind x for y'.
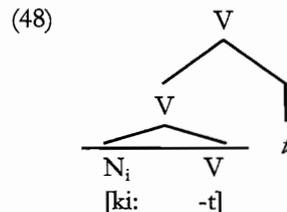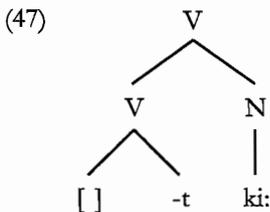(d) *ga'a*   'roast x'   *ga'id*   'roast x for y'.

The two transitivizing derivational endings combine here with simple transitives to form double object verbs. The "additional argument", corresponding to y of the gloss, bears the object role in syntax —semantically, this argument is the "beneficiary" or "recipient". The original object, i.e., x (the "theme"), is syntactically inert (for what is relevant here, at least):

(45) 'A:ñi   'ant   o   'i   xel   g   huk.
      I   AUX1   FUT   PRT   straighten   ART   board.
      'I am going to straighten the board'.

(46) 'A:ñi   'ant   o   'i   m-xeliñ   g   huk   ('a:pi).
      I   AUX1   FUT   PRT   2s-straighten:BEN ART   board (you).
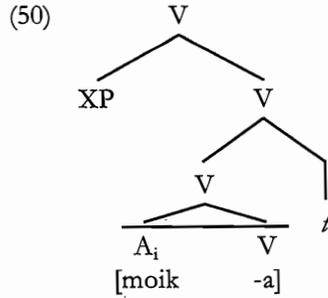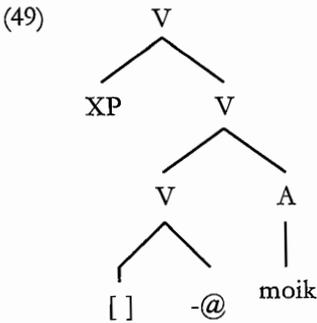   'I am going to straighten the board for you'.

We will content ourselves with this small sef of examples, turning now to the issue of whether overt derivational morphology of the type they represent exhibits behavior which is expected within a conception of lexical argument structure which accords the properties of (11) a fundamental theoretical role.

5.2. Constraints on derivational morphology

It is reasonable to propose that the morphologically composite 'O'odham verbs exemplified here are derived by incorporation, forced by the requirement of Full Interpretation, as suggested in the comparable English cases. Thus, for example, the verb *ki:t* 'build a house' has the initial lexical representation in (47) by hypothesis. Since the verb is a suffix —and therefore consists in part of an empty phonological matrix— it must incorporate its complement in order to satisfy Full Interpretation at PF as in (48):

(47)   V   (48)   V

              V   N   V |
                                                                              t_i
        [ ]   -t   ki: N_i V
                                                        [ki: -t]

Similarly, the de-adjectival inchoative verb *moika* 'become soft' has the following initial structure, in which /-@/ stands for an underspecified vocalic segment (eventually [-a] in this instance) and in which XP represents the internal subject required by the adjective; here again, incorporation is forced, giving:

(49)   V   (50)   V

              XP   V   XP   V

                    V   A   V t_i

              [ ]   -@   moik A_i V
                                                   [moik   -a]

Let us imagine that the scenario suggested by (47)-(50) represents correctly that aspect of 'O'odham verbal morphology which is concerned with the phonological realization of derived verbs. In summary, an overt derivational affix has associated with it an empty phonological matrix which must be filled in order to satisfy the requirement of Full Interpretation in phonology. This is what forces incorporation. But this is not all that must be said, however, since in addition to the observed phonological behavior of roots and affixes, there are asymmetries and biasses which must be accounted for in the *syntax* of derived verbs. We migh expect that some of this behavior is explicable in terms of (11) and associated principles.
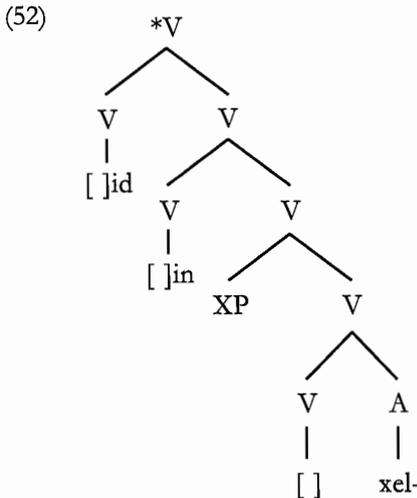
Consider, for instance, the diathesis-increasing derivational suffixes -*cud* and -*id*. These two together have what appear to be two distinct functions in 'O'odham. They derive "causatives", on the one hand, and "benefactives" (or double object verbs) on the other. They are causative, bringing an external argument ("agent" or "causer"), only when they combine with intransitive verbs, like those in (34a-f). When they combine with transitives, as in (44a-d), they form benefactives, bringing in an internal argument, the beneficiary or recipient. The suffixes have this function as well in forming the benefactive transitive counterparts of verbs of manufacture, as in (31a-c).

The problem is this. Why aren't these suffixes consistently simply *causative*? Might there be a systematic reason for this? Why doesn't *xelñid* mean 'have/make *x* straighten *y*', i.e., the causative? Why can't (46) mean 'I'm going to have/make you straighten the board?' And why doesn't *ki:cud* mean 'have/make *x* build a house?' And correspondingly, why doesn't (33) mean 'I'm going to have/make the kids build a house?' The explanation, we contend, comes from the fundamental nature of nouns and verbs, as set out in (11). Neither of these categories projects a subject in argument structure; hence, there is no source for the *x* in the hypothetical causative uses. The verb *xelñid* is based on the transitive verb *xelin* 'straighten *x*', already a "causative", based on the bound root *xel-* 'straight'.[9] The argument structure of this verb is as set out in (51):

---

(9) We are assuming for present purposes that this bound root is an adjective. This may be wrong, however. Since it combines with the suffix -*in* (an element which figures in the formation of many transitive verbs of "change of state") and forms with it a verb which is necessarily transitive, it is possible that *xel-* is a noun, functioning as the complement of P (in turn the complement of the matrix verb -*in*). There is, in fact, a noun *xel* in 'O'odham, meaning 'right, license' and therefore only tenuously related to the verb (51) synchronically. In its nominal use, *xel* is a free noun, not a bound root.

(51)
```
          V
        /   \
       V     V
       |    /  \
     [ ]in XP   V
              /   \
             V     A
```
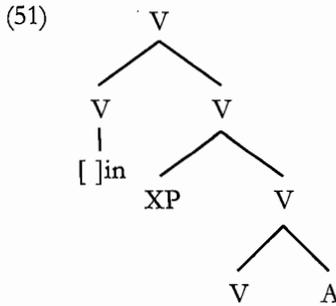
The internal verbal projection presents a specifier position, since the adjective, being a predicate, must have a subject to satisfy the principle of Full Interpretation, as formulated in (11). But the actual verb here, the transitive *xelin,* involves a higher verb, realized as the derivational suffix *-in.* This is the matrix head of the argument structure. Being a verb, and by hypothesis not a predicate in lexical argument structure, it does not project a subject. Thus further transitivization, by means of the syffix *-id,* cannot give rise to the causative, as this would require an internal subject in the immediately subordinate verbal projection. In other words, the hypothetical argument structure shown in (52) is impossible, since the intermediate verb cannot have a subject, there being nothing (no predicate) that forces its appearance:

(52)
```
          *V
        /    \
       V      V
       |     /  \
     [ ]id  V    V
            |   /  \
          [ ]in XP   V
                   /   \
                  V     A
                  |     |
                 [ ]   xel-
```

While incorporation itself could proceed to derive *xelñid* in this structure, and while it would in fact necessarily do so, in order to satisfy Full Interpretation, the structure is ill-formed, there being no subject for the intermediate V headed by [ ]in. That verb, being transitive, must have an external subject, an impossibility

here[10]. Essentially the same is true of *ki:cud*. This cannot be a causative based simply on the verb of production *ki:t*, because this verb, whose argument structure is represented in (47) and (48), does not have, and cannot have, an internal subject. Its head is V, and the latter's complement is N; neither category projects a subject in argument structure, in accordance with (11).
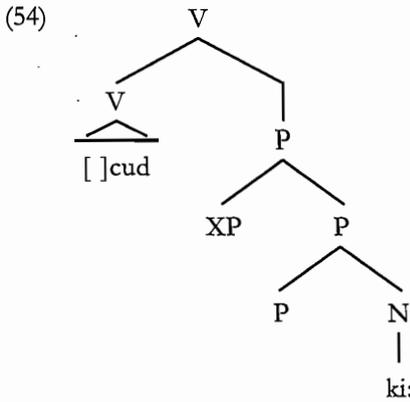
We can explain why *xelñid* and *ki:cud* cannot be causatives, but why can they exist at all? Why can they be benefactives? Our answer to this question is not, in our opinion, fully satisfactory as yet. We think, however, that it will be found in a theoretical framework like that developed in Hoffman (1991), according to which a benefactive (or applicative) predicator takes a canonical full predication complement which, by (11), must be a projection either of P or of A, the two [+subject] categories. We will limit our exemplification to the type represented by *ki:cud*, i.e., benefactive verbs of production, and we refer the reader to Hoffman (1991) for a fuller discussion of benefactives.

We have argued that the transitivizing suffixal verb *-cud* cannot take (47) as its complement, to form a causative, because its complement would in that case present no internal subject (corresponding to the syntatic object of the hypothetical causative). The argument structure of *ki:cud* cannot be as in (53), since the inner verbal projection cannot provide an internal subject, there being nothing there to force that:

(53)
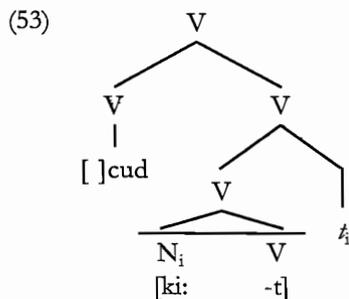
Suppose, however, that the benefactive verbs of production have the argument structure associated with locatum and location verbs, i.e., that of (9a) above. The argument structure representation of *ki:cud* would be as follows, under this assumption:
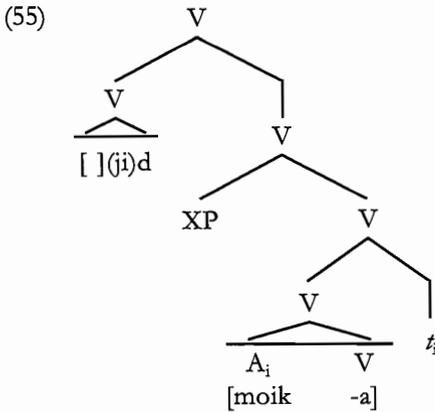
(10) Ultimately, the ill-formedness of (52) is a sentential syntactic matter. The intermediate V must have a subject in sentential syntax —it cannot in this case, since the higher V intervenes, preventing it from receiving the T-value required to activate its predicational capacity.

(54)
```
              V
            /   \
          V       P
         /‾‾\    /   \
       [ ]cud  XP     P
                     /  \
                    P    N
                         |
                        ki:
```
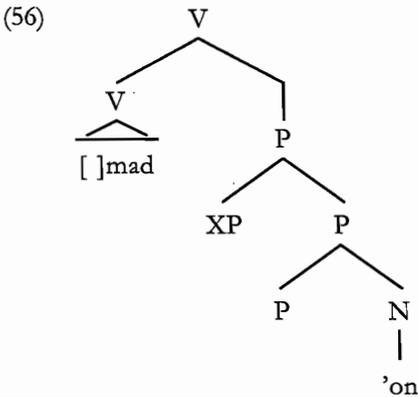
The internal subject, XP, is required by virtue of the lexically inherent predicational character of the category P, as registered in (11). The P itself, being empty, will incorporate its nominal complement *ki:;* and finally, the empty matrix associated with *-cud* will require incorporation of P, giving the derived verb *ki:cud.* This verb is grammatically transitive, of course, taking XP as its sentential syntactic object, is in the sentence (33) above.[11]

'O'odham derived de-adjectival and locatum verbs illustrate the central point here in a somewhat more direct manner. Verbs of the type represented by (37a-c) occur in pairs, intransitive and transitive, like the English verbs *clear* in *the screen cleared* and *she cleared the screen.* On the other hand, locatum verbs, like (41a-f) are transitive only, lacking any intransitive counterpart. How can this disparity be explained? Why is there no intransitive verb *'on-SUFF* meaning 'to get salty'? Or *jewer-SUFF* meaning 'get soiled, covered in soil'? These ideas can be expressed in 'O'odham, of course, but not with intransitive verbs of the suggested type. This follows from (11) straightforwardly. An adjective-based verb has a subject internal to its argument structure projection, necessarily, by virtue of the essential property of the category A (cf. (28) above, and for 'O'odham, (50)). Since an adjective cannot locate its subject within its own projection, its subject must appear in the specfier position of the immediately superordinate verb, as in (50). In the absence of further embedding, this gives the intransitive variant. The transitive variant is simply the causative, with the intransitive occurring as complement of a higher V, in this case *-(ji)d:*

(11) The "meaning" which can be associated automatically with (54) is correct, insofar as *ki:cud* is a benefactive verb, i.e., essentially a verb of "giving". Thus, the verb denotes an event in which an entity corresponding to the internal subject, XP, comes to "have" the entity denoted by the nominal complement, i.e., the "theme" *ki:,* through the agency of some other entity corresponding to the external subject. What is missing is the implication that the agent "made or produced" the theme. That is to say, the entailment relation which is reasonably said to hold between (33) and the simpler (32) is not expressed in (54). In Hale and Keyser (1994) we consider this to be a true problem, as yet not adequately addressed.

(55)

```
              V
           ___/\___
        V           \
      _/\_           V
     [ ](ji)d     __/\__
              XP         V
                      __/\__
                    V         \
                  _/‾\_        t_i
                 A_i    V
                [moik  -a]
```

This is entirely consistent with the view that argument structure and diathesis alternations are limited by the essential nature of the lexical categories. The *lack* of a parallel transitivity alternation on the part of 'O'odham locatum verbs is likewise understandable in these terms. Assuming, as we have for English, that locatum verbs in 'O'odham are P-based, it follows that they project subjects which are internal to the P-projection itself. The verbal head which selects the P is therefore *above* the internal subject, as in the assumed argument structure of the 'O'odham verb *'onmad* 'to salt x, to put salt on x':

(56)

```
              V
           __/\__
        V          \
      _/\_          P
     [ ]mad       _/\_
               XP       P
                      _/\_
                    P       N
                            |
                           'on
```

The derivation proceeds in the usual manner, forced by the principle of Full Interpretation in phonology. The aspect of (56) which is relevant here is the structural position of the internal subject XP. The verb locally c-commands XP, and under the default assumption that this structure will persist into sentential syntax, XP will bear the object relation there. There is no possibility of an intransitive alternant here, without application of some specific detransitivizing operation (such as passive or antipassive).

A final observation has to do with one of the processes involved in deriving transitive verbs from intransitives in 'O'odham. In (34) above, the suffixes *-cud* and *-id* are seen in the function commonly associated with the notion "causative". They

derive the causative form of intransitive verbs. Although we cannot establish this for each of the verbs in (34), we think it is reasonable to propose that the intransitives have an argument structure which contains an internal subject —they are, in other words, canonical unaccusatives. This is quite reasonable for verbs like *heum* 'to get cold' and *haag* 'to melt'. Our hypothesis, for better of worse, requires us to attribute to these verbs the same basic structure as that associated with de-adjectival verbs. From this it would follow that they exhibit the inchoative-causative alternation.

Not all 'O'odham intransitives behave in this manner, however. Some morphologically simple intransitive verbs combine with the suffixes *-cud*, *-id* to derive benefactives, not causatives:
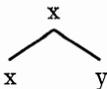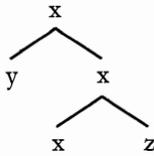
(57) (a) *ñe'c*   'sing'   *ñe'icud*   'sing for x'.
     (b) *na:d*   'build a fire'   *na:jid*   'build x a fire'
     (c) *cikpan*   'work'   *cikpañid*   'work for x'.
     (d) *gikuj*   'whistle'   *gikujid*   'whiatle for x'.
     (e) *ku'ag*   'get firewood'   *ku'agid*   'get firewood for x'.

On the view that the intransitives here are in fact "unergative", their argument structure is that associated with the verbs of production —i.e., parallel to (47) above. It follows, then, that they would not have causative forms. As in the case of verbs of production, their transitive counterparts are necessarily benefactives.

6. A final observation on argument structure

In this paper, we have explored the possibility that the "nature of the elements" is responsible for the observation that argument structures are severely limited in their variety and "size". If this is actually true, we have only partially shown that it is true. Unconstrained recursion, for example, is not entirely eliminated, since the category P, as we have characterized it, could in principle permit recursion if P itself can appear as the complement of P. This does not seem to happen in argument structure, but we are not sure why it does not. It remains a problem for further research, research which may either support or destroy the ideas explored here.

In evaluating the central proposal advanced here, we find it necessary to constantly remind ourselves that the *categories* which are relevant to the theory are the *primitive* parts of speech, so to speak, and not necessarily the nouns, verbs, adjectives, and adpositions of a particular language, as these latter do not reflect the former with absolute perfection. This fact is obscured, perhaps, by the conveninet abbreviations N, V, A, and P. A more accurate notation would be the projections themselves, as in the first row of (58), in which x stands for a category associated with a specific argument structure and y, z stand for its arguments:

(58)   (a) x   (b)   x   (c) y / x   (d)   x

                            /\   /\
                           x   y   y   x
                                                               /\
                                                              x   z

English	N	V	A	P
Navajo	N	V	V	N, P
Warlpiri	N	V	N	N, P

The first category has the property indicated, namely, it has no arguments—no complement and no specifier. The second category takes a complement, and no specifier. The third takes no complement but must be associated with an argument, its subject (this must be external to the projection of the category itself, a circumstance which follows from the fact that the category takes no internal argument, i.e., no complement). The final category takes both a complement and a specifier. The properties expressed in (58) correspond exactly to the features set out in (11) above. But it is these configurational properties, we maintain, which are the *true* defining properties.

Beneath the configurational representations appearing in (58), we present the predominant morphosyntactic realizations (N, V, etc) of these basic categories in three languages, English, the Athabaskan language Navajo, and the Pama-Nyungan language Warlpiri. There is cross-linguistic variation here, obviously. Even *within* a single language there is variability —the English "verb" *have* is probably a member of (58d), not (58b), for example; and English *weigh* and *cost* are probably "incorporating" varients of this same category. It is easy to find such "exceptions" in any language. So-called "psyche verbs" are notoriously variable in their morphosyntactic realization.

A related concern is that of *counterexamples*. Real counterexamples are of great value in linguistic research, since they can contribute to the perfection, or rejection, of a theory. And this represents an advance, of course. False, or apparent counterexamples, are also valuable, since their proper identification and explanation can help to support a theory. But the two sorts are distinct, and it is typically extremely difficult to distinguish the two. Counterexamples, of one or the other sort, to the proposal entertained here are manifold. Some are probably real and some are probably false. Our failure to express the entailment relation between (33) and (32) probably involves a true counterexample, one whose explanation will force a modification in the theory. On the other hand, there are many counterexamples which are merely apparent, due typically to a failure in the primary data. For example, while English *sleep,* we maintain, is an unergative, and therefore cannot have an internal subject and, therefore, no causative alternant (hence **we slept the child*), its favored 'O'odham translation *ko:x* readily forms a causative *ko:sid* 'put to sleep'. But this does not qualify as a counterexample, since the 'O'odham verb has a "change of state" use, unlike English *sleep* —*the child slept* does not have the same range of meanings as 'O'odham *koi 'at ga 'ali* 'The child slept/fell asleep'. The "change of state" variant, we maintain, has an internal subject, following from the fact that it involves the primitive category (58c), appearing as the complement (y) within (58b). English *sleep,* by contrast, involves (58a) in that function. A similar,

perhaps clearer, example of this sort of apparent counterexample is seen in the distribution of the Hebrew *hif'il* ("causative") binyan in relation to verbs meaning sleep —there is no *hf'il* form of the verb *ʃ-n*, the verb which most closely approximates English *sleep*, but there is such a form for *r-d-m*, a verb which approximates the change of state variant of 'O'odham *ko:x*.
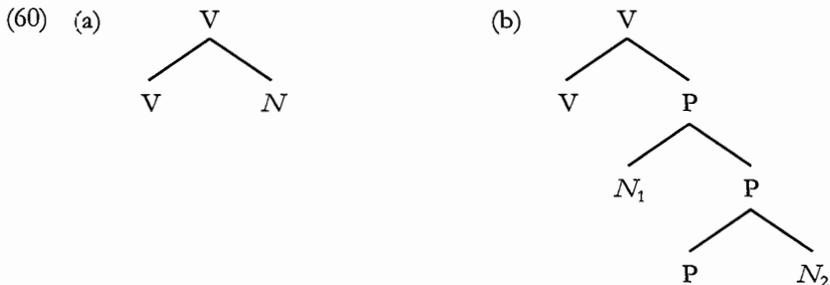
Failure in coverage, or "shortfall", is a type of counterexample. And in this sense, the class of constructions which we must recognize as counterexamples is large at this point —necessarily so, we feel, because the fundamental elements which we attribute to the theory are severely restricted and consequently poor in their ability to make distinctions which can be observed in virtually any collection of actual linguistic data. There is, in other words, a large "residue" which the present theory of argument structure fails to give an account of. Basically, we assume just two grammatical relations, complement and predicate —these derive the elementary categories of (58).[12]

Although we will continue for the present in our belief that this parsimonious system is correct, we are keenly aware of the impressive range of "argument structures" which it fails to accommodate.

We will mention one important type here, one variety of which involves the phenomenon called "conflation" by Talmy (1985), exemplified in (59):[13]

(59) (a) The kids ran into the room.   (c) Rizzuto slid into third base.
   (b) The horse jumped over the cattleguard.

The verbs of these sentences, and their like generally, represent the "conflation" of *action as means* ("running", "jumping", "sliding") and *movement to an end point* ("getting into the room, over the cattleguard, into third"). The problem which conflations of this type represent derives precisely from the fact that they appear to embody *two* concurrent event-like components. We are used to just one. It is tempting, and perhaps natural, to imagine that the argument structures of the verbs of (59a-c) are in fact composites of the unergative structure, as in (3) above, repeated here as (60a), and the structure associated with change of location, as in (9a), repeated as (60b) below:

(60) (a)   V   (b)   V
                        / \   /   \
                       /   \   /   \
                      V   N   V   P
                                                                   / \
                                                                  /   \
                                                                 N_1 P
                                                                        / \
                                                                       /   \
                                                                      P N_2

---

(12) Interestingly, these categories are the traditional four parts of speech, and the four defined by the feature system of Chomsky's "Remarks on nominalizations" (1970).

(13) We have used the term "conflation" to refer generally to "incorporation" involved in deriving denominal and de-adjectival verbs. Talmy's original usage, as we understand it, was restricted to manner-motion synthesis, and the like, as in the type under discussion here.

The first of these is associated with the simple unergative use of verbs like *run, jump,* and *slide,* while the second is the argument structure associated with verbs like *get* or *go* in verb phrases like *get into the room,* and the like. It is natural to think of the verbs of (59a-c) as composites of these two structures. Such a composite might, for example, be defined by means of a generalized transformation, substituting (60a) for the verb of (60b), giving the otherwise illegitimate (61) which, with appropriate overt elements, incorporations, and principles of interpretation would give derived verbs with meanings like *get into x running, bet over x jumping, get into x sliding,* etc.:[14]

(61)
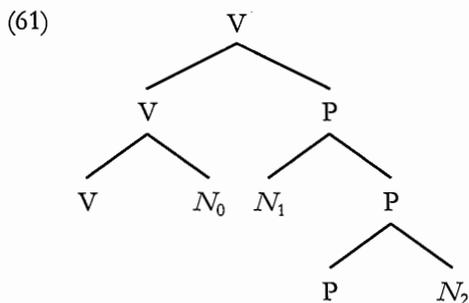
The same might be suggested for the benefactive constructions —e.g., *make Johnny a toy,* substituting *make a toy* at the point occupied by N_2 in (60b). In all such cases, it will be necessary to ensure that the external argument of the composite is related in a particular way (semantically) to each of the subcomponents. Thus, for example, in the benefactive *make Johnny a toy* the entity corresponding to the external subject both "makes a toy" and "does it for Johnny". This is not a particularly trivial problem, inasmuch as each among a variety of suggestive mechanisms to effect this "control" relation must be studied to determine whether it opens some "floodgate", subverting the original purpose of explaining the observed restricted nature of argument structure. It should be pointed out that this problem is not tied to the use of generalized transformations as suggested here, since "base generation" is not ruled out. Thus, for example, nothing prevents a VP of the type represented by *make a toy* from appearing as a complement to P (in place of N_2) in the basic argument structure representation (60b), Herein lies another tale, we are afraid. We do not fully understand yet what it is that limits the recursion of complements in the projection of lexical argument structures.[15]

(14) These have structures resembling, abstractly speaking, the structures of locatum or location verbs. They differ from these however, in that the P-projection is an overt "small clause". In sentential syntax As such, it enters into the conventional Raising construction—N_1 may raise to an appropriate external position, giving the s-structures of (59). By contrast, derived denominal locatum and location verbs do not have an overt small clause complement in sentential syntax and hence do not participate in the Raising construction; otherwise, *the books shelved* should be grammatical, contrary to fact (cf., the fully grammatical Raising construction *the books got on the shelf (mysteriously)*).

(15) We are reluctant to resort to a sentential syntactic explanation, such as the requirement that a nominal argument receive Case, tempting as this may be. Languages with multiple objetive Case marking (like Kichaga and

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Kinyarwanda, cf. Bresnan and Moshi 1990), do not, so far as we are aware, have morphologically simple verbs with recursive lexical argumental structures. To some extent, the more intimately *lexical* principle embodied in the EPP (Extended Projection Principle) is at work in limiting argument structure. If a verb gets no internal subject (i.e., does not inherit one from its complement), it must get an external subject. This principle averts forms like **sneeze the child, *make John trouble* (in the sense "cause John to make trouble"), but it does not prevent recursion of the category (58d), for example.