

23. Incorporation

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Abstract

This article overviews two distinct senses of the term incorporation. The first refers to a word-formation process akin to compounding, and is typically applied to the particular noun-verb compounding process known as noun incorporation. The second refers to a syntactic approach to word-formation innovated by Mark C. Baker, head-movement, which was proposed to account for noun incorporation and other verb derivations such as causatives and applicatives. Competing theoretical approaches to noun incorporation are discussed and evaluated, and then the application of Baker's incorporation approach to other derivational contexts, especially deadjectival and denominal verbs, is discussed and assessed.

1. Introduction

Discussion of the word-formation process known as “incorporation” is potentially fraught with difficulties at the outset because this term is used for different (not necessarily commensurate) meanings by different authors. In morphology, the two most common usages of the term *incorporation* are: (i) some type of word-formation process akin to compounding, especially in reference to *noun incorporation* (a special type of noun-verb compounding); and (ii) a word-formation process involving the syntactic derivation of morphologically complex words via head movement. The first meaning is a grammatical notion based on a long tradition of descriptive and typological research on various languages from around the world, whereas the second is a relatively recent theoretical innovation involving a syntacticocentric view of morphology which was pioneered by Baker (1988) in order to account for the descriptive process referred to in (i).

As it turns out, the first (and perhaps most common) usage of *incorporation* may be, at first blush, of less relevance to many European languages, since most of those are of a morphological type which does not heavily utilize incorporation in the traditional (descriptive) sense. If Baker's syntactic view of that process is on the right track, however, then other construction types (beyond N-V compounding) may make use of the same syntactic processes (e.g., head-movement) which form the traditionally-recognized incorporation constructions.

This article will thus first illustrate the most prototypical incorporation construction, noun incorporation, and discuss the major implications of this construction for different theories of morphology (section 2.); here we will primarily rely on data from non-European languages. I will then discuss the second notion of incorporation, Baker's syntactic head-movement analysis of noun incorporation (henceforth, NI) (section 3.). Next, I will illustrate the potential application of Baker's incorporation theory to the morphology of many languages, including English and other European languages, beyond traditionally recognized NI languages (section 4.). I will then conclude in section 5.

2. Noun incorporation

"Incorporation", in principle, can be understood to involve the combination of two different lexemes of any category to create a complex word, in a manner very similar to, if not actually identical with, compounding. However, this concatenation is often described as a verb (somehow) taking (the head of) its complement into its own morphological structure. Matthews (1997) thus defines one meaning of incorporation as follows:

- (1) **incorporation.** A regular process by which lexical units which are syntactically complements of verbs can also be realized as elements within the verb itself: e.g. schematically, *hunt-rabbit*-PROG-3SG 'He is hunting rabbits, is rabbit-hunting'.
(Matthews 1997:173)

The prototypical instantiation of this process, which is illustrated by the quotation from Matthews above, involves a verb incorporating a nominal. This nominal is usually taken to be the verb's notional object argument, and when that is the case then it instantiates the prototypical instance of "noun incorporation" (NI). But in some cases incorporation can also involve a nominal indicating the manner of the action expressed by the verb, or the instrument used to perform the action of the verb. These are sometimes referred to as "manner incorporation" (Harley 2005) and "instrumental affixes", respectively. On manner incorporation, more will be said in section 4.

With respect to instrumental affixes, it is important to note that while the etymological sources of such affixes are often nominal, and while many of these constructions may have originated from the actual morphological process of noun incorporation, in practice these elements can have adverbial (rather than strictly nominal) meanings, e.g., indicating the type of motion or manner of use rather than the actual specific type of instrument used (Mithun 1999: 119). Thornes (2003) gives the examples in (2) to show that different instrumental prefixes in Northern Paiute (Uto-Aztec) can be used to describe different uses for the same actual instrument — in this case it could be a wooden spoon — which is used in different manners for creating different culinary products (e.g., soup vs. gravy, the latter requiring a more horizontal positioning of the instrument to make the stirring motion):

- (2) Northern Paiute
- | | | |
|---|--|-------------------------|
| a. <i>tsi-kwiduʔi</i>
IP/sharp -stir
'stir (e.g., soup)' | b. <i>wɪ-gwiduʔi</i>
IP/long -stir
'stir (e.g., gravy)' | (Thornes 2003: 357 [7]) |
|---|--|-------------------------|

The verb root is the same in both of the above examples, the difference being which "instrumental prefix" gets incorporated onto the verb stem. Given the fact that these "instrumental affix" constructions involve adverbial usages of what once used to be nominal roots, and that verbs can also serve as the etymological sources for such affixes (Thornes 2000), this construction type has more in common with manner incorporation (see below) than NI, strictly speaking.

Returning to NI proper, it would be difficult to find another single construction type in modern linguistics which has had both such a long history of debate and which has played such a pivotal role in motivating new theoretical developments. With NI serving as a paradigmatic case of a morphological construction existing at the interface of the morphology with the syntax,

different theoretical approaches have either tried to pigeonhole it into one grammatical module or the other (i.e. the morphology or “lexicon”, on the one hand, vs. the syntax, on the other), or to allow the two modules to overlap to some degree.

The locus classicus of the controversy surrounding the proper analysis of NI can be found in a series of papers authored by the eminent Americanist linguists A. L. Kroeber and Edward Sapir, from 1909 to 1911, which resulted from their observation that NI constructions can commonly be found in the indigenous languages of the Americas. The crux of their argument is still at the heart of many debates in modern theoretical linguistics, and it involves the fundamental question of how separate the morphological and syntactic components of the grammar ought to be. Sapir (1911) held the view that word-formation (i.e. morphology) was separate from syntax, whereas Kroeber (1909, 1911) wanted to allow some bleeding between the two components. As discussed in detail in Haugen (2008a, 2009), this debate has been maintained into the present era under the guise of Lexicalist (or, what I have termed the “neo-Sapirean”) vs. syntacticocentric (or, what I have termed the “neo-Kroeberian”) approaches to morphology.

In the more modern era, which has seen various developments in theorizing since the “Chomskyan Revolution” of the 1950s and 1960s, the same issues have been at the forefront of debate, and discussion of alternative analyses of NI has led to the development of a variety of different theoretical perspectives on the issue. Another prominent disagreement hinging on the appropriate analysis of NI can be found in the mid-1980s back-and-forth between Marianne Mithun (1984, 1986) and Jerrold Sadock (1980, 1986).

Mithun (1984), for instance, offers a typology of cross-linguistic NI constructions with an eye toward explaining their diachronic development in different languages. Crucially, for Mithun, morphology must be fundamentally distinct from syntax, as per her dictum that NI is “the *most nearly syntactic* of all morphological processes” (p. 889, emphasis added). In each of the Comanche NI examples in (3), for instance, a nominal root is morphologically attached to a verb stem to create a complex verb stem:

(3) NI in Comanche (Uto-Aztecan) (Mithun 1984: 855)

- a. *nar'inoo'-r'iki-*
saddle-put.away
'to saddle up'
- b. *p'ih'i-tсах-kwe'ya-*
fuzz-by.hand-remove
'to skin an animal'
- c. *wana-roh-peti-*
cloth-by.force-throw
'to gamble'
- d. *waa-hima*
cedar.tree-take
'to celebrate Christmas'

For Mithun, this compounding process is *nearly* syntactic because the complex word relates constituents of a sentence that are normally related syntactically (i.e. a verb with a nominal object argument), and the process can be very productive (which is another prototypical characteristic of syntax). However, this compounding process must be regarded as morphological, for Mithun, because they are not entirely free (even if they may be productive), and, as word-formation processes, they are quite prone to lexicalization; e.g., see examples (3c) and (3d) above, which have idiomatic meanings (and are thus not transparently syntactic). With this clear bifurcation of grammatical modules in mind, then, Mithun thus adopts a neo-Sapirean perspective on the topic of NI.

Sadock (1980, 1986), on the other hand, argues that NI in West Greenlandic displays very clear syntactic properties, including the modification of incorporated nominals by external adjectives (and other nominal modifiers). An example is shown by the contrast between (4a) and (4b):

(4) Incorporation in West Greenlandic (Eskimo-Aleut) (Sadock 1980: 307)

- a. *Sapanngamik kusanartumik pisivoq*
 bead-INST beautiful-NOM-INST thing-get-INDIC-3sg
 ‘He bought a beautiful bead.’
- b. *Kusanartumik sapanngarsivoq*
 beautiful-NOM-INST bead-get-INDIC-3sg
 ‘He bought a beautiful bead.’

(4a) illustrates a nominal root (*sapanng-* ‘bead’) in an object position NP, whereas (4b) shows the same nominal root as incorporated into the verb stem (the inflected form of ‘get’). Note that the nominal modifying adjective, *kusanartumik* ‘beautiful-NOM-INST’, can appear with both construction types. Sadock claims that this and other external modifiers form a constituent with the incorporated nominal in (4b), derived from (the equivalent of) a deep structure like (4a). If this is the case, then perhaps there can’t be such a clear separation of morphology from syntax. For this reason, Sadock adopts more of a neo-Kroeberian view of the process of incorporation.

One important difference between Sadock’s West Greenlandic data and cases of NI presented by Mithun, however, lies in the fact that the verbal stems in Greenlandic are obligatorily bound elements — i.e. they are affixal in nature. Mithun (1986) maintains that NI applies only to those situations in which the verbal element itself may be a free morpheme without nominal support. She regards Sadock’s Greenlandic case as an instance of *denominal verb formation* (i.e. the derivation of a verb from a nominal root), rather than NI per se. This position cleverly leaves open the possibility that denominal verbs may inter-leave morphology and syntax while still maintaining the further possibility that true NI would remain morphological. However, plenty of other languages do allow external modification of incorporated nominals even in the case of NI with optionally free verb roots, so this tactic does not actually resolve the issue for those languages. (We will return to the issue of denominal verbs possibly involving incorporation in section 4 below.)

Consider a paradigmatic case of NI from Mohawk:

(5) Incorporation in Mohawk (Baker 1988: 65)

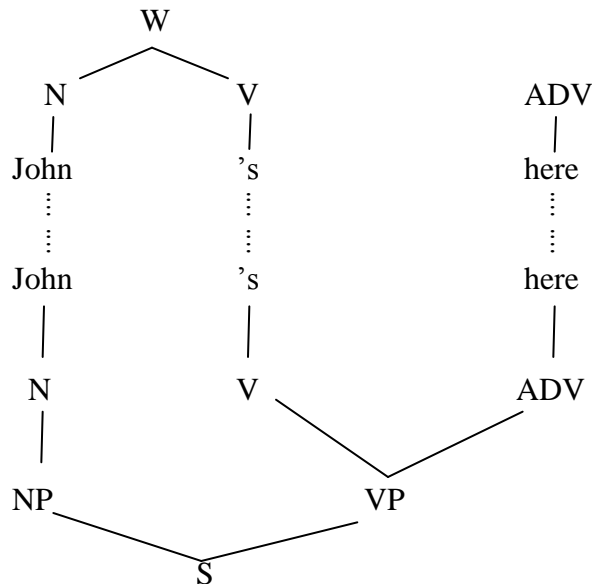
- a. *Ka-rakv* *ne* *sawatis* *hrao-nuhs-a?*
 3N-white DET John 3M-house-SUF
 ‘John’s house is white’
- b. *Hrao-nuhs-rakv* *ne* *sawatis*
 3 M-house-white DET John
 ‘John’s house is white’

The difference between (5a) and (5b) shows clearly that predicates such as *Ka-rakv* ‘to be white’ can incorporate their internal argument (as in 5b, where the root *nuhs* ‘house’ is part of the complex verb stem), but they do not have to (cf. 5a). Baker (1988) analyzes such constructions as involving a movement operation wherein the underlying theme or object moves up the tree into the verbal position, given the connection between the incorporated nominal head’s external modifier, here the possessor DP *sawatis* ‘John’, as well as an attractive theoretical position that theta-roles are always assigned to the same syntactic positions (which explains the semantic “Deep Structure” connection between such alternations as the active vs. the passive, where the latter is derived from the former via transformational rules or their equivalents). (Baker 1988: 46 codifies this proposition, i.e. that thematic relations are universally related to specific syntactic configurations at Deep Structure, as the Uniformity of Theta Assignment Hypothesis, or UTAH).

Baker calls the syntactic movement process itself *incorporation*, and a large subsequent literature has followed this usage. We will consider Baker’s analysis in more detail in the next section. Before that, however, let us consider two more prominent theoretical approaches to the phenomenon of NI: Autolexical Syntax and Lexicalist theories.

Autolexical Syntax is a theory that was proposed by Sadock (1985, 1991) to account for the NI facts of West Greenlandic and other languages. For Sadock, morphology and syntax are two completely autonomous modules of grammar which contain their own principles and rules, and they may assign different structural descriptions to words, phrases, and sentences. For example, in an English example with an auxiliary clitic like *John’s here*, the clitic =’s can be dually analyzed: i.e. in the syntax it can be analyzed as a V heading a VP with an adverbial complement (*here*), whereas, simultaneously, in the morphology it is attached at the word level to the N *John*. Sadock offers a notation with two different tree structures attaching to the sentence, as shown in (6). Sadock’s convention for constructing these trees is to put the morphological representation on the top, and the syntactic one on the bottom.

(6) The Autolexical Syntax Analysis of English Aux Cliticization (Sadock 1985: 385)



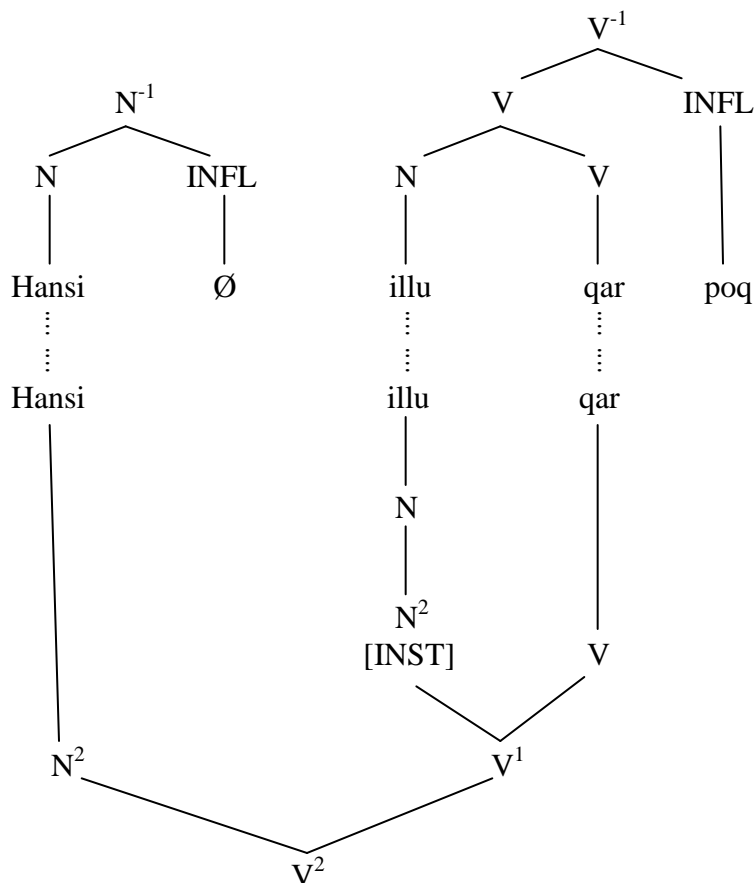
For the case of NI, Sadock extensively discusses and analyzes cases from West Greenlandic (among other languages). A simple example is given in (7):

(7) *Hansi illo-qar-poq* (Sadock 1985: 400)

Hans house-have-INFL
 'Hans has a house'

Sadock's Autolexical Syntax analysis of (7) is shown in (8). Note that for Sadock inflectional morphemes (such as case morphology on nouns and inflectional suffixes on verbs), which are represented in the morphological trees (in the top representation), are not represented in the syntactic tree, since, for Sadock, these are products of the morphology and are not relevant to the syntax. Also, in Sadock's syntactic trees the numeral superscripts, which are a nowadays non-standard notation, correspond to more standard X-bar theoretic notation (e.g., superscript 2 is the phrasal level (XP or X''); superscript 1 is X'; no superscript is a head, X⁰); the mirror of this notation is given as negative integers in the morphological representations: -1, -2, etc.

(8) The Autolexical Syntax Analysis of West Greenlandic NI (Sadock 1985: 401)

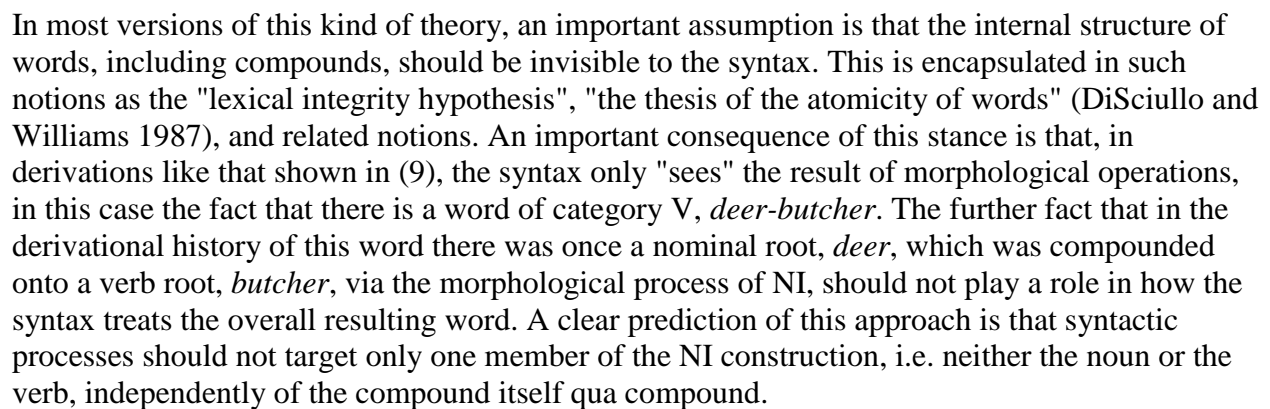


While very well-designed to account for stranded modifiers, which can appear in the object NP (“N²”) complement of the VP (i.e. as sister to V, branching off of the V’ (“V¹” in (8)), and which agree in features with the nominal head of that phrase, it is not quite clear how the Autolexical Syntax approach would be able to handle cases of object NPs which contain overt cognate or hyponymous nominal arguments, which will be discussed in detail in section 4. below. We will focus in more detail, therefore, on theories which have been much more widely adopted in the literature, i.e. the head-movement theory of Baker (1988), the appellation of which is the second usage of the term *incorporation* (and which is the focus of the next section), and Lexicalist theories, to which we now turn.

Lexicalist theories, in general, propose a clear partition between the grammatical modules of morphology (typically referred to as “the Lexicon”) and syntax. For this reason such theories can usually be regarded as neo-Sapirean in the classification discussed above. Discussions of these theories typically divide them into two types: Strong Lexicalism and Weak Lexicalism. In the Strong version of the theory all word-formation processes are held to take place in the lexical component of the grammar (see, e.g., DiSciullo and Williams 1987). Weaker Lexicalist theories may allow some word-formation processes, such as inflection, to have access to the syntactic component (relegating other processes, such as derivation and compounding, to the Lexicon) (see, e.g., Anderson 1982).

Lexicalist theories of NI, such as that proposed by Rosen (1989), hold that NI simply results from the process of compounding a noun and a verb in the lexicon to yield a complex

(9) Lexicalist Analysis of NI: The Lexicon feeds the Syntax



(10) Head-marking reduplication in Hiaki (Yaqui) (Haugen and Harley 2013)

- While this is a serious problem for Weak Lexicalist theories (which by architectural design require that inflection must occur after derivation), it is less of a problem for stronger Lexicalist theories which have all word-formation processes, including inflection, occur in the Lexicon. Such theories could in principle allow interleaving of derivation and inflection — but in doing so they actually over-predict such interactions, as with DiSciullo and Williams’ (1987) examples like *?parts-supplier*, *?choirs-boy*, etc., which not all English speakers agree are acceptable. Such theories still face serious challenges, though, from the fact that NI constructions are typically

limited to certain thematic relations (e.g., patient or theme) while robustly ruling out others (e.g., agents), a fact which is not necessarily expected if NI results from simple N-V compounding; see Haugen and Harley (2013) for further discussion of challenges to Lexicalist theories from head-marking reduplication in Hiaki NI (and other compounding) constructions.

There is an alternative to Lexicalist theories which holds that the NI word-formation process occurs outside of, and prior to, syntax; namely, to actually allow the syntax itself to participate in the word-formation process. This approach has been adopted by Baker (1988) in his incorporation theory, and this perspective has been followed by many others in subsequent research.

3. Incorporation as a syntactic process

We have seen that some linguists, adopting theoretical orientations which presuppose that the domains of morphology and syntax must be kept distinct, note that NI comes close to breaching the divide between them. Such a proposal has been offered both as a typological generalization (e.g., Sapir) and a theoretical proposition (e.g., Mithun 1984, from a functionalist perspective; as well as Rosen 1989, from a more formal, i.e. generativist/Lexicalist, perspective). The just mentioned theoretical perspectives have adopted this partition of morphology from syntax in various guises, either by maintaining that morphology and syntax are indeed autonomous components which interface with one another (e.g., Sadock's Autolexical Syntax), or that one component, morphology, can feed into the other component, syntax (e.g., Lexicalism).

There exists, however, a third type of theory which allows the domains of morphology and syntax to overlap — specifically, by allowing syntactic structures and processes to build words (i.e. morphological structures). We may refer to this kind of theory as "syntactocentric". In the case of NI, the most prominent syntactocentric theory has been proposed by Mark Baker (1988), who allows the nominal head of VP-internal (object) NPs to move into the verbal position by syntactic head-movement. This process itself is termed "incorporation" by Baker, and much work has adopted and followed the essence of his analysis.

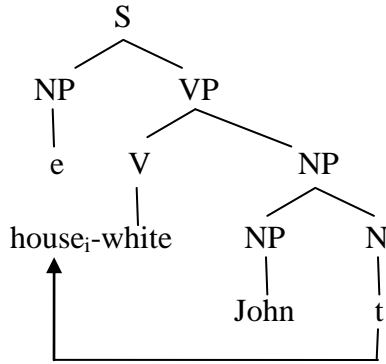
By employing syntactic head movement Baker (1988) accounts for a few key features of the NI construction. First, it derives the placement of the nominal head in the verb complex from the syntactic representation. This analysis of incorporation explains the pattern of NI demonstrated in Mohawk, as shown in (11) which repeats the data from (5) above:

(11) Incorporation in Mohawk (Baker 1988: 65)

- a. *Ka-rakv* *ne* [*sawatis* *hrao-nuhs-aʔ*]
 3N-white DET John 3M-house-SUF
 'John's house is white'
- b. *Hrao-nuhs-rakv* *ne* [*sawatis t*]
 3 M-house-white DET John
 'John's house is white'

Baker's analysis of the NI construction in (11b) is given in (12):

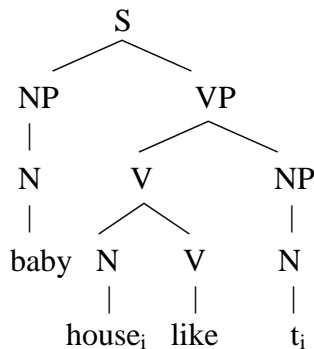
(12) NI as head movement (adapted from Baker 1988: 48 [38])



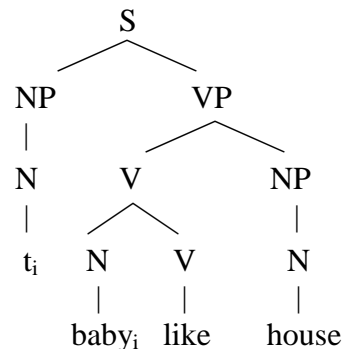
The trace left in the embedded NP in (11b) shows the original position of the incorporated nominal, which “strands” its external modifiers, in this case a possessor NP, after moving up the tree. This stranding analysis is similar in spirit to Sadock’s Autolexical Syntax analysis, since both propose that the nominal head of the complement object forms a constituent with its modifiers at some level of syntactic representation.

This kind of analysis is extremely appealing because of a second key feature: namely, that independently motivated syntactic constraints, such as Travis’ (1984) Head Movement Constraint, explain the asymmetry between (agentive and other VP-external) subjects and (VP-internal) objects. If movement must occur upward in the tree, as is standardly assumed, then a moved head would be able to govern its trace (via c-command). Downward movements of subjects is not possible because the traces of such movement would not be able to be governed (i.e. the trace, in this instance, would c-command the moved head). Baker (1988) provides us with a contrasting set of trees to illustrate the point:

(13) a. Object incorporation



b. Subject incorporation (Baker 1988: 83)

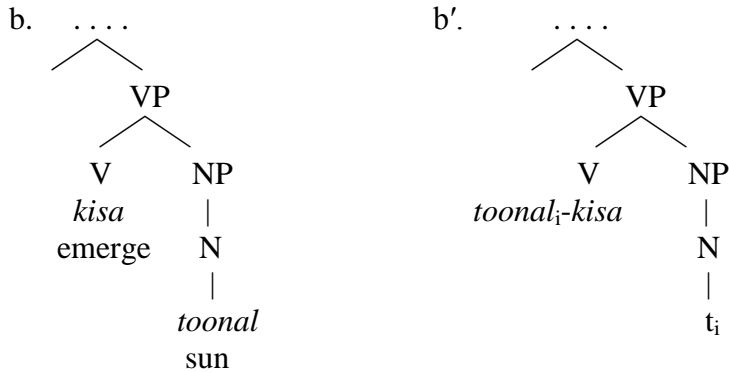


In regard to the exclusion of subjects from incorporation constructions, it is important to note here that adherents of Baker’s approach adopt the unaccusative hypothesis of Perlmutter (1978), wherein some intransitive “subjects” are actually objects in Deep Structure. Such nominals are able to incorporate in some languages, e.g., Nahuatl:

(14) Unaccusative Subject Incorporation in Tetelcingo Nahuatl (Tuggy 1986: 457)

a. *toonai-kisa*
sun-emerge

‘the sun comes out’



Such nominals are typically themes or patients, which are theta roles assigned within VP given assumptions about theta role assignments in Baker’s theory. Baker’s analysis, then, is intended to exclude VP-external subjects (as with unergative intransitives), which are prototypically agents, which is largely in accord to the empirical facts about NI which have been observed since at least Kroeber (1909). This account predicts that unergative verbs should not be able to incorporate their subjects, which are presumed to be generated external to the VP (e.g., in an external functional head, e.g., voice^o or v^o; cf. Kratzer 1996, Harley 1995, and much other work). As we will see below in our discussion of Hale and Keyser’s (1993, 2002) extension of Baker’s incorporation theory to denominal verbs, unergatives *are* able to incorporate their internal (i.e. theme and patient) object arguments.

While more recent work in generative syntax has developed a more complicated syntactic tree structure (e.g., more functional heads) than what was originally envisioned by Baker (1988), the crucial insights of Baker’s incorporation analysis have been largely maintained in many current (generativist) theoretical approaches to morphology as well as to syntax. External subjects (agents) are projected external to a functional projection above the VP, typically regarded as vP or voiceP, and they therefore cannot move down the tree into the V position.

Other extensions of Baker’s theory have also been proposed in light of innovations in generativist syntactic theorizing since Principle and Parameters theory, such as the Minimalist Program (Chomsky 1995) and its variety of inter-related theoretical frameworks, e.g., the Bare Phrase Structure of Chomsky (1994) and the Antisymmetry approach of Kayne (1994). This latter approach makes the strong proposal that the underlying structure of all phrases is universal (and, in the clausal context, of the form SVO), with deviations involving various kinds of movements. Barrie (2011) adopts this position and applies Moro’s (2000) Dynamic Antisymmetry theory to account for the patterns of head-movement found in cross-linguistic NI constructions. Under Barrie’s approach all NI constructions involve adjunction of the complement object to the right of the verbal head. For theory-internal reasons bare N’s must move to the specifier of the verbal head (i.e. to the verb’s left), while DP objects can remain in situ (i.e. to the right; this supposes that we are talking about SVO languages, since SOV languages would require some other motivation for moving the base-generated object DP to the left of the verb; see Julien 2002 for extensive discussion). Without concerning ourselves here about the merits of such a strong (and potentially controversial) theoretical stance, it is clear that the kernel of Baker’s proposal has been maintained even in this kind of theory. See Barrie and Mathieu (2012) for a recent critique of attempts to re-vamp (and possibly even abrogate) Baker-

style head-movement, as well as discussion of how and why these attempts remain problematic in the face of the cross-linguistic facts brought forth by NI. See Muro (2009) for an antisymmetry-based approach which invokes XP movement of verb roots rather than X^0 movement of noun roots to account for the differential placement of the N in NI constructions (i.e. whether the N is pre-verbal or post-verbal within the verb complex).

We must now address a final question about the nature of NI: what is it that can be incorporated? I argued above that it appears that only elements receiving particular theta roles may be incorporated: i.e. themes and patients but not agents. Discussion of NI has generally assumed that this applies to nouns (i.e. to the category N), but some authors have actually applied the notion of incorporation to more nuanced levels of syntactic structure. For example, Massam (2001) shows that NPs can also “incorporate” in Niuean (Polynesian), in that this phrasal category in that language must front with its verb if it cannot receive absolutive case-marking. Massam thus derives variable orders of Niuean verbs with definite DP objects (which have VSO order) and verbs with indefinite NP objects (which have VOS order). Massam’s claim is that the underlying order for all Niuean clauses is SVO, and that the object must front with the verb if it lacks functional structure above the NP level (such as would be involved in definiteness, case, referentiality, etc.). She calls this “pseudo-incorporation”, because the syntax is similar to NI, but there is no actual morphological merger of the NP to the V in pseudo-incorporation. (Cases of more traditionally recognized NI can also differ with respect to how close the bond must be between the nominal and verbal elements. Mithun (1984: 849), for example, refers to cases of *composition by juxtaposition*, which involve the same process as NI, i.e. compounding a noun to a verb to create an intransitive verb, without actually forming a single compound word.) So, if Massam’s analysis is correct, incorporation may apply above the level of N, to NP, but it perhaps cannot apply to nominal structure as robust as DP, presumably due to the assignment of case or some other independently motivated syntactic reason.

Some authors have also applied the notion of incorporation to syntactic structure *below* the level of N. While much linguistic theorizing has traditionally taken lexical categories such as *noun*, *verb*, *adjective*, etc., to be syntactic primitives, some recent work, e.g., within Halle and Marantz’ (1993) Distributed Morphology framework, has proposed that, rather than being primitives within the grammar, the lexical categories actually emerge as the result of a more complex syntactic structure. A famous example is Marantz’s (1997) notion that the English word *cat* is a “phrasal idiom” — specifically, an uncategorized Root, $\sqrt{\text{CAT}}$, which can only become a noun after being nominalized with an abstract (i.e. phonologically null) syntactic functional head, *n*. This complex structure is shown in (15b), in contrast with the standard (and structurally simpler) primitive view of categoryhood shown in (15a):

(15) CAT as a “primitive noun” vs. CAT as a “phrasal idiom” (cf. Marantz 1997)



Mathieu (2013) extends this more complex structural analysis to the domain of NI, arguing that languages can vary in what is actually able to be incorporated: from uncategorized Roots to more complex nominal material, e.g., a Root with some inflectional and/or derivational affixes. The important point here remains that, despite some cross-linguistic variation in what specific aspects

of the nominal domain can enter into NI constructions, much mileage has been gotten out of applying Baker's syntactocentric head-movement incorporation approach to NI. Of course, there are dissenting views to the syntactocentric movement approach to NI. For some of these critical takes on Baker's incorporation theory and its relatives, see Sadock 1990 and/or Van Valin 1992, among others.

4. Applications and extensions

If Baker's incorporation theory was just limited in its scope to NI, strictly defined, then its application would similarly be limited to those languages which display the cross-linguistic characteristics of NI — e.g., many languages of the Americas, for instance, but far fewer in the languages of Europe. English, for example, does not have true NI because putatively similar N-V compound constructions typically involve deverbal nominalizations (e.g., *baby-sitter*, *money-lender*, etc.) rather than the productive creation of true verbs. The few cases which do involve actual verbs are generally back-formed from these nominalizations (e.g., *to baby-sit*, *to bar-tend*, etc.), rather than being formed productively from N-V compounding, and even so they usually do not have an unincorporated counterpart (e.g., *?I sat the baby on Friday night*); one exception is *tend the bar*, but in this case *the bar* is not referential, as is often the case with NI (Baker 1988: 78). Other European languages which may illustrate some of the crucial properties of NI in the traditional typological sense include Dutch and Frisian (Weggelaar 1986), Hungarian (Kiefer 1990), and Icelandic ([see article 141 on Icelandic](#)).

However, from the outset Baker's incorporation theory was intended to capture a range of morphosyntactic phenomena beyond NI, including morphological causatives (as incorporated verbs) and morphological applicatives (as incorporated prepositions), with the same syntactic mechanism: head-movement (i.e. *incorporation*, in Baker's sense). In this section we will turn our focus to the extension of Baker's incorporation theory to other derivational contexts involving verbs and nouns — specifically, verbs derived from nouns (i.e. denominal verbs) — which greatly broadens the range of languages for which the incorporation analysis may be relevant.

In a very influential contribution to the morphosyntax of denominal verb-formation, Hale and Keyser (1993) propose that unergative denominal verbs, like those shown in (16), are formed from underlying transitive structures where, as with NI, the verbal root is derived from a verb incorporating its nominal object which head-moves from its base-generated position as a complement to V.

(16) English unergative denominal verbs (Hale and Keyser 1993: 73 [34])

- a. The child laughed.
- b. The colt sneezed.
- c. Petronella sang.
- d. The ewes lambled.

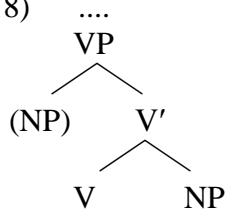
Such derived verbs correlate to the transitive equivalents in (17):

(17) Transitive counterparts to English unergative denominal verbs (Hale and Keyser 1993: 73 [35])

- a. We had a good laugh.
- b. This mare does a nice trot.
- c. She did her new song.
- d. The ewe had its twins.

Under Hale and Keyser’s analysis, both construction types derive from the same syntactic Deep Structure — one which involves a verbal head taking an NP complement to which it assigns an internal theta role (e.g., theme or patient, in accordance with Baker’s Uniformity of Theta Assignment Hypothesis). This structure is shown in (18):

(18) (Hale and Keyser 1993: 73 [36])



While the heads of the object NPs of the transitive verbs in (17) remain in situ, they raise (via head-movement) to the verbal position in the unergative verb cases of (16), as an instance of Baker-style incorporation.

While the analysis of unergative denominal verbs in English typically involves null “light verbs”, a cross-linguistic analysis of unergative verbs with similar meanings in other languages show that such constructions can often involve overt lexical light verbs, as with Basque *egin* ‘do’; see the examples in (19):

(19) Basque unergatives = [N + *egin*(_{vdo})] (Hale and Keyser 2002: 117 [22])

a. negar	egin	‘to cry’
b. eztul	egin	‘to cough’
c. barre	egin	‘to laugh’
d. jolas	egin	‘to play’
e. oihu	egin	‘to shout’
f. lo	egin	‘to sleep’
g. zurrunga	egin	‘to snore’

Hale and Keyser argue that the Basque situation is the general case, where a nominal semantically composes with a light verb to yield something along the lines of ‘do N’. While Basque does not actually involve incorporation per se, some languages do require incorporation, including the English-style cases (which by hypothesis involve null light verb affixes) and other languages which have overt functional heads, such as derivational suffixes, requiring incorporation. This latter kind of pattern is ubiquitous in the Uto-Aztecan language family (Haugen 2008b); some examples from Tohono O’odham are shown in (20):

(20) Tohono O’odham unergatives = [N + -t(_{vdo})] (Hale and Keyser 2002: 133 [48])

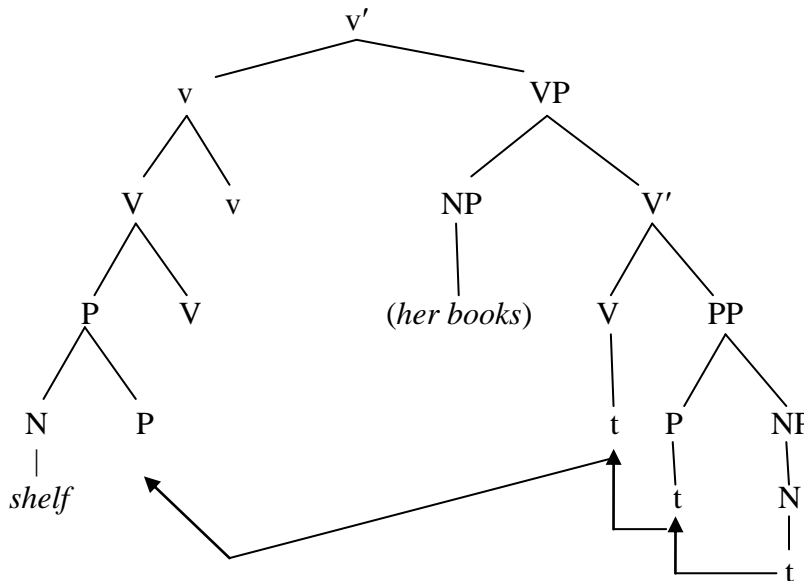
a. ki:	‘house’	ki:-t	‘to build a house’
b. juñ	‘cactus candy’	jun-t	‘to make cactus candy’
c. hoa	‘basket’	hoa-t	‘to make a basket’

d. ha'a	'pot, olla'	ha'a-t	'to make a pot, olla'
e. si:l	'saddle'	si:l-t	'to make a saddle'

The incorporation process would be the result of language-specific parameter-setting, and may be driven by “phonological defectivity” (Hale and Keyser 2002: 63) of the light verb in English and other languages requiring incorporation for their unergative denominals.

Even more complex denominal verb derivations can also be explained by Hale and Keyser’s incorporation account, including location denominal verbs like *shelve*, the derivation of which is shown in (21):

(21) The Derivation of a Location Denominal Verb (~ Hale and Keyser 1993: 58 [8])



In this derivation, N incorporates into P (~ *on N*); this complex P then incorporates into a stative V head (~ *be on N*); and this complex then itself incorporates into a higher verbal head indicating causation, i.e. *v* (~ *cause to be on N*). Each movement operation obeys Travis’ Head Movement Constraint, which requires moving up the tree to the next highest head without skipping any heads en route.

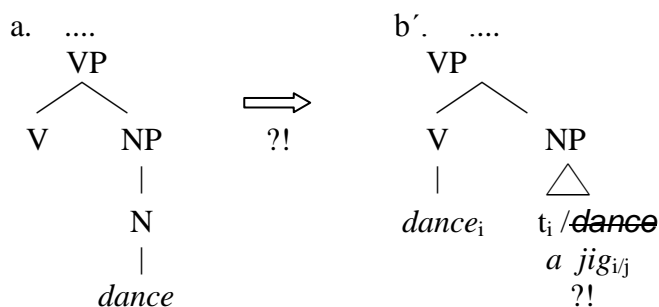
Other verbs which are claimed to derive via similar incorporation processes include locatum verbs (which denote the object transferred to a location, e.g., *bandage*, *butter*, etc.) and deadjectival verbs (e.g., *redde*n, *lighten*, etc.).

Several criticisms have been lodged against this approach, including the issue that this type of incorporation, in English at least, does not seem to allow “stranded” modifiers of the type seen in other incorporation cases seen above (e.g., in West Greenlandic and Mohawk). For example, an incorporation analysis of the structure in (21) might lead one to expect possible sentences like **He saddle_id the horse Western t_i*, which are not licit in English. (See Kiparsky 1997 for this and other criticisms of the Hale and Keyser incorporation approach to English denominal verbs, and an alternative approach to these constructions.) A possible response to this objection would be that “modifier-stranding” is itself dependent on the independent existence of “null-head” modifiers in a given language. If this is the case, though, then this weakens one of

the key motivations for positing a movement analysis for NI in the first place, since the verb could be formed from noun-verb compounding in the Lexicon with this lexically-derived complex verb taking a complement NP with no overt N but with modifiers (i.e. a null-head NP). (See Rosen 1989 for related discussion and a Lexicalist theory of NI exactly along these lines.)

Even if such criticisms can be surmounted, a crucial empirical issue facing the syntactic head-movement approach to denominal verb-formation, as well as to NI as traditionally envisioned, is the fact that these constructions can often co-occur with an overt nominal in the complement position. This overt nominal is either cognate with (i.e. root-identical to) the incorporated noun, or it is interpreted as a more specific instance of the incorporated noun. When such a hyponymous object appears, it is not obvious how the supposedly incorporated nominal creating the verb would be related to the object position:

(22) The Hyponymous Object Problem



Baker's original analysis of NI in Mohawk did not have to deal with this issue because Mohawk, as a polysynthetic language, does not have overt NPs in argument positions. Some other noun-incorporating languages, such as Hopi (Hill 2003), though, clearly do have object NPs that originate in these positions, as evidenced, in the Hopi case, by such facts as relatively strict SOV word order, overt accusative case-marking, etc.

Haugen (2008a, 2009) offers a solution to this problem by adopting a crucial notion from Distributed Morphology (among other approaches): Late Insertion, which holds that morphemes, containing their phonological instantiations, do not actually appear in the syntactic structure until after the syntax has performed operations such as head-movement (or, in a slightly different technical implementation, the copying of abstract morphosyntactic features). At Spell-out, it appears to be possible (in some languages at least) to insert different roots into the head and tail of an incorporation chain. The hyponymy relation between the two different roots is one of induced pragmatic inference, along the lines of Grice's Maxim of Quantity, because hyponymy readings can be coerced in situations where two roots otherwise do not necessarily encode 'more specific than' meanings in relation to one another. For example, in Hiaki one can both *horse-have a dog* (i.e. 'have a dog and use it as one would canonically use a horse') or *dog-have a horse* (i.e. 'have a horse and use it as one would canonically use a dog'); note that this account of hyponymous objects would be difficult to implement in Sadock's Autolexical Syntax framework, discussed above. This is not a fact about speakers' knowledge or opinions about horses or dogs in Hiaki culture, but rather an artifact of the coercion of meaning that occurs by putting either one root or the other at the head or the tail of the chain of movement.

A similar analysis for denominal verb constructions and NI constructions is particularly appealing given the similar nature of these constructions. Some languages, such as Hopi, seem to

have identical properties for the two construction types, including modifier-stranding, cognate and hyponymous objects, and the introduction of nominal discourse referents (Hill 2003; see also Haugen 2008a, 2009 for additional discussion). Some languages do show some differences between the two construction types, however, including Hiaki, which tends to only have intransitivizing NI which does not allow for the stranded modifiers or hyponymous objects which are quite acceptable in denominal verb constructions (cf. Haugen 2008b). A further difference is that NI is not fully productive in this language, unlike the situation for denominal verbs. See Gerdtz and Marlett (2008) for additional discussion of denominal verb constructions and a comparison of these with NI, pertaining especially to the indigenous languages of the Americas.

Nevertheless, the close connection between denominal verbs and NI constructions necessitates some consideration of the possibility that they may justify a unified analysis. A further empirical fact about English denominal verbs, which drives this point home particularly clearly, is that cognate direct objects tend to be judged as redundant when they do not co-occur with some kind of external modification. Contrast (23) and (24):

- (23) Pragmatic Redundancy with Cognate Objects
 - a. Hortense is laughing/dancing.
 - b. ?Hortense is laughing a laugh/dancing a dance.
 - c. ?Hortense is laughing the laugh/dancing the dance.
- (24) Less Redundancy with Modifiers for Cognate Objects
 - a. He laughed a false laugh that held genuine bitterness. (Michael Chabon, *Gentlemen of the Road*, p. 187).
 - b. Hortense is dancing a happy dance.

There is no similar proscription against non-modified “cognate subjects”. In the relatively few cases where an English noun shares root identity with its verbal counterpart, it may freely appear as a subject of that verb whether it be modified or not:

- (25) No proscription against “Cognate Subjects”
 - a. The cook is cooking (dinner/the dinner).
 - b. The snitch snitched.

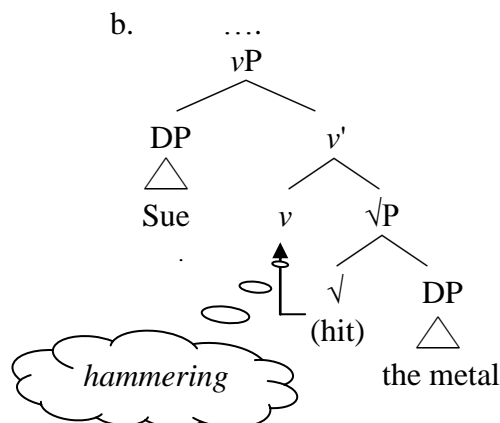
Such facts are consistent with the Hale and Keyser-style analysis of unergative denominals — if the verb is formed via incorporation of its object then the object needs some kind of modification or else its expression would be redundant. As mentioned above, though, modifier stranding is not possible in English, cf. *Hortense is laugh_i-ing a happy t_i*, presumably because of independent constraints on “null-head” modifiers.

While much mileage may be gotten out of this kind of analysis, not all instances of denominalization can be accounted for via head-movement incorporation. Verbs derived from nominals not originating in argument positions, such as instrumental or manner verbs, would be hard to countenance in this theory, since head-movement from adjunct positions would ultimately violate the Head Movement Constraint because the trace of such movement would not be properly governed by the moved element. For cases like this, direct merger of the Root into the verbal position has been proposed, in a process that Harley (2005) dubs “manner conflation”.

This is akin to the cases of instrumental affixes discussed above in reference to NI constructions, which often indicate the manner of a verb as much or more than the actual instrument used to do whatever is denoted by the verb. The structure of manner conflation is shown in (26):

(26) Manner Conflation (Harley 2005)

a. *Sue was hammering the metal.*



Similar to the case of NI applying to levels below “N” as discussed by Mathieu (2013), Arad (2003) proposes that this kind of conflation can involve bare roots or more complex structures such as nominalizations (i.e. a root plus the functional head n), based on data from Modern Hebrew and English. Arad’s English analysis is reliant on an argument by Kiparsky (1982) that there are two different classes of instrumental denominals in English. The first class is derivationally based on an underlying nominal and supposedly requires that, when an instrumental PP appears with such a verb, that PP must contain the same noun as appears in the verb. This is the *tape* class, cf. the contrast between: *She taped the poster to the wall with duct tape.* vs. **She taped the poster to the wall with pushpins.* In the second class, the derived verb is not derived from an underlying nominal, so there is some freedom in the nominal root that can be expressed in an adjunct instrumental PP. This is the *hammer* class; cf. the contrast between: *She hammered the metal with a ball-peen hammer.* vs. *She hammered the metal with her shoe.* Harley and Haugen (2007) show, however, that the *tape* class can indeed allow non-cognate instrumentals if examples can be found wherein those nominals can take on the same manner of use as that implied by the conflated nominal; cf. the non-problematic nature of *tape*-class examples like: *She taped the poster to the wall with band-aids.* The implication is that manner conflation in English always derives from the conflation of a bare root, rather than a categorized (i.e. pre-nominalized) root, into the verbal position.

5. Conclusion

In this article we have reviewed some of the major issues involved in the analysis of incorporation, and we have seen that there exist two distinct notions of this term: (i) the descriptive notion of a process akin to compounding (typically involving the noun-verb compounding seen in noun incorporation, or NI), and (ii) a theoretical construct, head-movement, which was developed by Baker (1988) as a syntax-based account for the

morphological process identified in (i). The latter, theoretical, notion of incorporation has been applied to a range of morphological constructions beyond NI, including the formation of causatives and applicatives, as well as the formation of deadjectival and denominal verbs.

The issues surrounding incorporation have been a perennially intriguing domain for linguistic analysis, and all future novel theories of morphology and syntax, and the interface between those two components of the grammar, will continue to need to take into account the on-going developments in the study of this morphological domain.

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