Morphologie
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Ein internationales Handbuch zur Flexion und Wortbildung
An International Handbook on Inflection and Word-Formation

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1. Characteristics of noun incorporation

The term incorporation has traditionally been used to refer specifically to noun incorporation, a construction in which a noun stem is combined with a verb to form a new, morphologically complex verb (Sapir 1911). The effect of the process can be seen in the sentences in (1) from Tuscarora, an Iroquoian language of New York State and Ontario. (1a) contains a basic transitive clause, (1b) contains its counterpart with incorporation of the noun stem /-r-y/‘tree, log’.

(1) Tuscarora (Elton Greene, speaker)
(a) /u-r-y-n-e wa?-t-k-r-y/-
   N-log-nom.suff aor-du-1.sg-split-pfv
   ‘I split a / the log, logs.’
(b) /wa?-t-k-r-y-n-úk-r/-
   aorist-dualic-1.sg-log-split-pfv
   ‘I split a / the log, logs.’

(2) Chukchee (Polinskaja & Nedjalkov 1987: 257)
(a) /g-un-n ta-atwat-a-rkan utkuc'-en/
   1.sg-erg 1.sg-set-0-present trap-abs
   ‘I am setting a trap.’
(b) Gam t-ootkuc'-ta-atwat-a-rkan
   1.sg.abs 1.sg-trap-set-0-present
   ‘I am trap-setting.’

Incorporation is often found within polysynthetic languages, those with a high average number of morphemes per word. Of course incorporation itself adds to the degree of synthesis, but the two features are not necessarily linked otherwise. Many polysynthetic languages lack incorporation entirely, while some more analytic languages show it.

Noun incorporation appears in a large number of the world’s languages with similar formal and functional features. These features are described in Kroeber (1909; 1911), Sapir (1911), Mardirussian (1975), Merlan (1976), Hagege (1977; 1978; 1980), Mithun (1984; 1985; 1986 a; 1986 b), Baker 1988, and many others.

1.1 Formal characteristics

In prototypical incorporation, the noun-verb compound constitutes a single phonological word, conforming to the general phonological patterns of other words in the language. If the language has vowel harmony, for example, this may extend across the noun-verb complex. The effect of vowel harmony can be seen in the sentences in (2) from Chukchee, a Luorvatlan language of Siberia. As an independent noun with instrumental suffix, ‘trap’ appears as /utkuc/’, but incorporated, it has the shape /ootko/’.
Such noun-verb compounds also behave as single words with respect to stress. In Tuscarora, stress is basically penultimate; in isolation, both verbs and nouns are stressed on the next to the last syllable, as in (1a) above. The verb with incorporated noun receives a single, penultimate stress, as in (1b).

Normally only the noun stem is incorporated. In some languages noun stems have the same form as independent nouns. In others, however, stems never appear as independent words. The Tuscarora noun ‘log’ in (1a), consists of the neuter prefix /u-/ the stem /r’q:n-/ ‘log’, and a nominal suffix /-el/. As can be seen in (1b), only /-r’q:/ is incorporated. Whatever the nominal morphology of a language, number affixes, case markers, determiners, quantifiers, and other modifiers are not normally incorporated with the noun.

The absence of these markers reflects an important syntactic difference between incorporated nouns and their independent counterparts. Incorporated nouns do not constitute noun phrases and do not function as syntactic arguments of their clauses. This difference can be seen in the Chukchee examples in (2). Case marking in Chukchee follows an ergative pattern. The first person pronoun in /gam-nan/ ‘I’ in (2a) is in the ergative case. The noun /atk’u-č:an/ ‘trap’ is in the absolutive case. The clause is grammatically transitive. In (2b), however, the first person pronoun /gam/ ‘I’ is in the absolutive case. The noun /tok’č:/ carries no case marking and bears no case role within the clause. The clause is grammatically intransitive.

Incorporated nouns can bear several kinds of semantic relationships to their associated verbs. Most commonly they denote semantic patients of otherwise transitive verbs, as in (1) and (2) above. In many languages, intransitive verbs also incorporate, as in (3).

(3) Tuscarora (Elton Greene, speaker)

/Ka-hšéhár-ahkwahsit/ NEUTER-ash-be.good

‘They are good ashes.’

Not all intransitive verbs are likely to incorporate. Most commonly, those with semantic patients incorporate, although exceptions have been noted.

In some languages, incorporated nouns represent semantic instruments or locations. In the sentence in (4) from Koyukon, an Alaskan Athabaskan language, the incorporated noun ‘raft’ implies a kind of instrument.

(4) Koyukon (Axelrod 1990: 181)

/neela: enohaguché:tot/ meat PP-TER-RAFT-ASP-handle.compact

‘He’s bringing meat home by raft.’

In (5) from Kiowa, a Tanoan language of Oklahoma, the incorporated noun ‘town’ (a loan), indicates a locative goal.

(5) Kiowa (Watkins 1984: 227)

/lèk’sléy+tvá:šn+bà-t’o:/

1.PL-together+town+GO-FUT

‘We will go to town together.’

1.2. Typical functions

The basic function of incorporated nouns is to modify the verb, narrowing its scope semantically. Thus while the Tuscarora verb /-urq:/ in (1) denotes any splitting, the compound verb /-r’q:n-urq:/ denotes a more specific kind of activity, log splitting. While the Chukchee verb /ntawat-i/ in (2) has the general meaning ‘to set’, the verb /otkoč:n-tawat-i/ means specifically ‘to trap-set’.

Most commonly, noun incorporation is used as a basic word formation device. It provides a means of creating new lexical items for unitary concepts: recurring, nameworthy events or states, like splitting logs and setting traps.

As qualifiers, incorporated nouns do not specify referentiality. As a result, they are often used for nonreferential, nonspecific, indefinite, unindividuated items. They appear in verbs describing habitual or generic activities, rather than for particular events involving specific patients. This distinction can be seen in the sentences in (6) from Comanche, an Uto-Aztecan language of Oklahoma. In (6a), the noun ‘quilt’ refers to a specific object and appears outside of the verb. In (6b), the complex verb simply describes a kind of activity.

(6) Comanche (Charney 1989: 179)

(a) /uhlka nìi sone marikai/ that.OBJ I quilt.OBJ finish.COMPL

‘I finished the quilt.

(b) /tíasì nìi sone’ai/péti/ also I quilt-do-DISTR:GEN.ASP

‘I also do quilting.’

Because analytic forms like that in (6a) are used when the noun and/or verb merit individual attention, they can, in some languages, carry an implication of deliberateness. Axel-
rod notes in that Koyukon, certain analytic constructions like that in (7a) “work to individuate the activity, bringing the pieces of it

(7) Koyukon (Axelrod 1990: 192)
(a) åsekka'  beyeeghestleyh/
   /se+kkaa'  be+yee-ghe+se+tleyh/
   1.SG.POSS+foot 3.OBJ+in-ASP+1.SG.SU+place.long.obj
   ‘I manually picked up my foot (because, e.g., it was asleep, paralyzed) and put it in it.’

(b) /hcyeckkaaghastleyh/
   /be+yee-kkaa-ghe+se+tleyh/
   3.OBJ+in-foot-ASP-1.SG.SU+place.long.obj
   ‘I stuck my foot in it.’

Noun incorporation is used in many languages for another purpose. Since it can alter the argument structure of a verb, it is utilized to manipulate the case roles of participants.

This use is especially frequent with terms for body parts. Events and states affecting body parts generally affect not simply the part, but also the owner, an effect that is typically more pernicious to a discussion. With incorporation, the body part term is backgrounded and the owner has the status of a core argument (subject, object, patient, absolute), rather than a simple possessor. The Tuscarora verb /yunghwakne/ ‘it is painful, it aches’, for example, can be used of a body part. This verb could be combined with a separate possessed noun such as /ktarreh/ ‘my head’ to yield the sentence ‘my head hurts’ but speakers usually incorporate, as in (8).

(8) Tuscarora (Elton Greene speaker)
/Wak-ta'ranahwacks/
   1.PATIENT-head-ache
   ‘I have a headache.’

(10) Mayali (Evans 1996)
/yika kun-kun-kom a-bu-ni/
//kun-beri a-bakke- yi,  iv-wing 1.MIN/3.MIN-break-PI or iv-neck 1.MIN/3.MIN-hit-PI
   ‘I might break its wing, or I’d hit it in the neck,
   /yika kun-kew a-keb-badji-di-ni/ or iv-beak 1.MIN/3.MIN-beak-smash-PI
   or I’d smash its beak.’

The choices in argument structure provided by incorporation are not limited to body part terms. In the Chukchee sentence in (11a), a bear is cast in a salient core case, the

(11) Chukchee (Polinskaya & Nedjalkov 1987: 244)
(a) /Tung-e  key-n akka-gt t-m-nen/
   friend-ERG bear-ABS son-DAT kill-3.SG/3.SG
   ‘The friend killed a bear for his son.’

(b) /Tung-e  ek k  key-nm-nen/
   friend-ERG son-ABS bear-kill-3.SG/3.SG
   ‘The friend bear-killed for his son.’

into sharper focus. The activity has the feeling of being more careful, studied, deliberate” (Axelrod 1990: 191).

Similar effects can be achieved with transitive verb roots. The Tuscarora verb /wä'kkwaht/
‘I cut (it) off’ could be combined with an independent noun identifying an object. If one is cutting someone’s hair, however, it is more idiomatic to incorporate the root ‘hair’.

(9) Tuscarora (Elton Greene, speaker)
/Wä'khe-kye'sw-akwaht/
   AORIST-1.SG/3-hair-cut.off
   ‘I hair-cut him, gave him a haircut.’

With incorporation, the hair has no grammatical case role, but the owner of the hair, a more significant victim of the haircut, is the grammatical patient.

Of course if the focus of attention is on the body part itself, it will be expressed as an independent noun. A speaker of Mayali, a Gunwinggun language of Australia, recounted that when a magpie goose would come up, he would throw a goose stick at it.

absolute. In (11b), the bear is backgrounded by incorporation and the son is cast in the salient absolute case.
A somewhat more unusual kind of case manipulation is reported for Koyukon. Nouns for 'wind', 'water', etc. cannot appear as agent subjects of certain volitional verbs that imply intent. They may be incorporated into such verbs, however, to indicate their instrumental role in bringing about an event.

(12) Koyukon (Axelrod 1990: 186)

(a) /tohebetaat1taanh/
    /to-hebe+tele+1-taanh/
    water-3-PL.OBJ+ASP+Cl+animate.lie
    'They floated away.'

(b) */too hebetaat1taanh/
    /too hebe+tele+1-taanh/
    water 3-PL.OBJ+ASP+Cl+animate.lie

In many languages, incorporation is used extensively to manipulate the relative salience of nouns. Those representing significant information, worthy of individual attention, may appear as independent words, while those representing less newsworthy information may be backgrounded by incorporation.

The use of this device can be seen in the Tuscarora passage in (13). A fox had summoned his friends to watch him compete in a contest. He told them to watch his tail. As long as it stood up, he would be winning, but if it fell, they should escape. When he first directed their attention to the tail, an independent noun was used. Once the reference was established, the noun was incorporated.

(13) Tuscarora (Elton Greene, speaker)

2-PL-watch this 1-tail FUT-2-PL-see this N-stand the then
'You watch my tail. You will see it standing upright. (This means that I am winning.)

Whenever I drop my tail, you will run away.'

Discussion of the pragmatics of noun incorporation in Eastern Cushitic languages can be found in Sasse (1984).

In some languages, incorporated nouns can qualify the meaning of the incorporating verb without affecting its argument structure. In (14), the verb 'gather' appears with an incorporated noun 'group', but the resulting stem is still transitive. It even appears with an independent patient nominal.

(14) Tuscarora (Elton Greene, speaker)

/Wa-hra-”tey-arûtâq-?”
AORIST-M-group-gathered-PVF the those DU-N-fly

'He gathered together those who fly.'

The incorporated root qualifies the meaning of the verb as a kind of collecting, assembling a crowd, while the independent nominal identifies the particular patient.

Structures like that in (14), with both incorporated and independent nouns, are sometimes called classificatory (Woodbury 1975; Mithun 1984; 1986a; 1986b; Rosen 1989; Derbyshire & Payne 1990). The incorporated noun root, usually relatively general in meaning, is a semantic hypernym of the more specific independent noun phrase. Incorporated nouns may even have a more general meaning when incorporated as classifiers than when independent. In Mund-uruku, for example, a Tupi-Guarani language of Brazil, many body part and plant terms indicate shape when incorporated as classifiers. The term /ba4/ 'arm', for example, is used as a classifier for long rigid objects (Gonzales 1987).

As verbal qualifiers, these incorporated nouns actually classify predicates. In some languages this classification can be extensive. Among the Iroquoian languages, large numbers of verbs incorporate the noun */-ya?/- 'body', */-ni:kohr/- 'mind', or */-rihw/- 'matter, idea'. They effectively partition a portion of the vocabulary into events and states affecting human beings physically
2. Delimitation of the construction

Incorporating constructions with the forms and functions described in 1. appear in a large number of genetically and geographically diverse languages. Several other constructions also exist that share certain formal and functional similarities with incorporation. The resemblances suggest that for many purposes they might be considered kinds of incorporation. At the same time, their differences indicate that for other purposes they should be kept distinct.

2.1. Phonological cohesion

As noted in section 1.1, prototypical noun incorporation involves the coalescence of a noun and verb into a single phonological word. A number of languages exhibit constructions similar in many ways to incorporation, though the associated noun and verb retain their individual phonological integrity as separate words. Such constructions have been termed noun stripping (Miner 1983; 1984; 1986; 1989), presumably because the nouns appear without inflectional marking.

Examples of stripping can be seen in Tamil (Steever 1979). Stripped nouns in Tamil retain their status as independent phonological words. Like incorporated nouns, they do not appear with number markers, case markers, or adjectives. They can affect the argument structure of the verb. The first person pronoun in (15a) in genitive, but that in (15b) is in the unmarked nominative case.

(15) Tami (Steever 1979: 280-1)
(a) /eğu-nụtāya/ mukam malarntatu/
   I-GEN   face   bloom.PAST.3.N.S
   ‘My face bloomed.’
(b) /nā́g mukam malarntēg/
   I(NOM) face   bloom.PAST.1.SG
   ‘I face-bloomed’
   = ‘I experienced pleasure.

In (16), the combination of the verb ‘show’ and the noun ‘mark’ yields a transitive verb ‘identify’ that can take a new direct object, here ‘boy’.

(16) Tamil (Steever 1979: 284)
/nā́g oru paya llama atāiyālam kāṭtinēn
   I one boy.ACC mark   show.PAST.1
   ‘I identified a boy.’

A variety of syntactic tests indicate that the stripped nouns bear no grammatical relations to the verb and do not function as noun phrases in other constructions. They do not serve as the antecedents of reflexives, trigger agreement, control equi-NP deletion, or host quantifiers or conjunctions. They may not be conjoined to other nominal constituents in a clause or be clefted. They appear in one position only, before the verb.

Steever notes that

“although the productivity of this construction appears to be limited only by the ingenuity of Tamil speakers, a number of common verbs recur: / pūṇam/ ‘work’, /key/ ‘do’, /āṭi/ ‘strike’, /pēṭa/ ‘put’, /vital ‘leave’, /pitiyakka/ ‘grab’, etc. Nouns, both native and foreign, seem to be drawn from a wide variety of semantic fields; body parts, for example, appear incorporated frequently.” (Steever 1979: 287)

A number of combinations are lexicalized. Steever points out that since stripped nouns are not referential, they do not distinguish definiteness or specificity.

“If an internal noun receives a specific or definite reading (e.g. for /pen par/ ‘see a bride-prospect’), it is due to a conversational implicature from contextual knowledge (one interviews girls as brides one at a time).” (Steever 1979: 285)

The Tamil construction thus looks much like prototypical noun incorporation in both form and function. It does differ in one detail. The emphatic particle /lān/ ‘indeed’ may
appear between the stripped noun and verb, but it may not separate bound morphemes.

(17) Tamil (Steever 1979: 285)
(a) /avan vēlai tān ceytāg./
  he work EMP do.PAST.3.M.SG
  ‘He really worked.’
(b) */avar-tāg-ka| snēkitarka|/
  they-EMP-pl. friends-pl.
  ‘They really all are friends.’

Nadèb, a Brazilian language of the Makú-Puinave family, also shows a stripping construction. Like that in Tamil, it shares a number of formal and functional characteristics with prototypical noun incorporation, but it also shows some important differences. An example is in (18b).

(18) Nadèb (Weir 1990: 323)
(a) /tug bi da-tēs/
    tooth 1.SG.POSS THEME-hurt
    ‘My tooth hurts.’
(b) /lih tug da-tēs/
    1.SG tooth THEME-hurt
    ‘I tooth-hurt’
    = ‘I have a toothache.’

The argument structure of the verb complex is altered, as in prototypical incorporation. The speaker, considered more significantly affected than the body part, assumes a core case role.

A few of the noun-verb constructions have idiomatic meanings, such as /mooh wūt/ ‘hand/arm be in movement (work)’ (Weir 1990: 335). Some nouns appear only in these constructions. Some nouns show more general meanings in these constructions than independently, as is common in classificatory incorporation. The noun /nuuh/ ‘head’ often pertains to spherical objects in general.

(20) Indonesian (Myhill 1988: 116)
  Se-buah talam yang ber-isi
  penganan di-angkat orang-lah ...  
  a-CLASSIFIER tray RELATIVIZER MIDDLE-contents snack PASSIVE-bring person-by
  ‘A tray full of snacks was brought (by a person) ...’

This construction serves the typical discourse function of incorporation, backing the noun. The person bringing the tray in (20) is “so backgrounded that it is difficult to include it at all in English” (Myhill 1988: 117). Nouns in the construction typically represent participants that are low in individuation and specificity.

The construction differs from prototypical noun incorporation in a significant way: only semantic agents are involved. It is a device for further backgrounding the agents of passives. Passivization is marked by the prefix di- on the verb. Agents in this construction may either be case marked with oleh ‘by’, or immediately follow the verb, as in (20).

Stripping constructions can thus show many of the other formal and functional characteristics associated with prototypical incorporation. Whether or not they are classified as incorporation must depend upon the purposes of the classification.
2.2. The Status of the components

In prototypical incorporation, a noun stem is combined with a verb stem to yield a complex verb stem. The term incorporation has also been applied to morphological combinations of other kinds of elements.

It has sometimes been used more broadly to include morphologization of elements other than nouns. In Baker (1988: 1) incorporation is defined as "processes by which one semantically independent word comes to be 'inside' of another". In this category are noun incorporation, verb incorporation, preposition incorporation, and passive incorporation. Pronominal affixes like those in the Tuscarora examples here have sometimes been termed incorporated pronouns. To the extent that such morphological constructions share various properties, it is useful to consider them as a group. Where they do not, it is useful to recognize their differences.

The term incorporation has also been applied to certain constructions involving derivational affixes in place of verb or noun stems. Eskimoan languages contain numerous verbalizing suffixes that derive verbs from noun stems. Examples can be seen in (21) and (22).

(21) Central Alaskan Yup'ik (Elena Charles, speaker)
Tuavet kuyvirluni
tua-vet kivya-ir-lu-ii
there-allative net-set-sub-3.sg
'He would set a net there.'

(22) Central Alaskan Yup'ik (Elena Charles, speaker)
gerailivkarluku'll
ger'aq-li-vkar-lu-ku=llu
fishrack-make-allow-sub-3.sg-obj=too
'and I had him build fishracks'

These constructions differ formally from noun incorporation strictly defined. Yup'ik, like its relatives, is an exclusively suffixing language. Nouns and verbs consist of a single initial root optionally followed by a potentially large number of suffixes. Morphemes like -ir- 'set' and -li- 'make' never appear alone or even word-initially, but must always follow a root. They are not demonstrably related to modern roots in any of the languages, as can be seen by examining cognate forms in Fortescue & Jacobson & Kaplan (1994). Sadock (1985) makes similar points in his discussion of Greenlandic.

At the same time, the derived Eskimo verbs do share certain characteristics with prototypical noun incorporation. The noun stems that serve as their bases, like the Yup'ik kuvya 'net' and ger'aq 'fishtrap' above, bear no case or number markers. They do not function as core arguments of their clauses. The verb 'net-set' in (21), for example, is grammatically intransitive: its only core argument is the agent 'he'. The verb 'have (him) build fishracks' in (22) is transitive, but its object is the person asked to work ("him"), not the fishracks. Nouns for body parts may appear in such derived verbs, as they often do in noun incorporation; here, too, it is the owners of the parts rather than the parts that serve as arguments of the clause. The feet are not arguments in either (23) or (24) for example. The only core argument of (23) is 'I'.

(23) Central Alaskan Yup'ik (George Charles, speaker)
it gaarlua
it'gaq-ir-tu-a
foot-be.cold.indic.intransitive-1.sg
'I am foot-cold (My feet are cold).'

The core arguments of (24) are 'I' and the animal I shot.

(24) Central Alaskan Yup'ik (George Charles, speaker)
it'gacartaqa
it'gaq-car-la-qa
foot-hit-indic.transitive-1.sg/3.sg
'I hit it right in the foot.'

Such noun + suffix combinations, again like incorporating structures, are very often lexicalized: learned, stored, and selected as units, not a surprising feature for derived stems. Speakers have clear ideas of which combinations already exist in the language, though they can easily invent new ones. The verbalizing suffixes vary widely in their productivity; some appear in only a few formations and are not used to create new verbs, while others are pervasive and easily used creatively. The feature of lexicalization is discussed in detail for Greenlandic Eskimo in Fortescue (1979) and Denny (1989).

An interesting issue is the referentiality of the nouns that serve as the bases of such constructions. We know that roots in derived constructions are usually opaque to reference. The English noun gardener, for example, does not seem to us to involve reference to a specific garden. The verbalizing suffixes in Eskimoan languages show two patterns.
Many noun + suffix constructions are used to derive names for recurring, nameworthy activities, a function typical of noun incorporation as well. The nouns in these structures tend to be generic, simply evoking a kind of entity. Such constructions can be seen in (25) and (26). The verb in (25) is based on the noun stem egamaarluk 'half-dried fish' (itself derived from the verb root ega- 'to boil' plus the nominalizing suffix -maarluk 'food prepared by Ving')

(25) Central Alaskan Yup’ik (Elena Charles, speaker)
_Egamaarlukkiurlua._
egamaarluk-kiur-lu-a
half-dried.fish-prepare-sub-JSG
'I would make half-dried fish.'

(27) Central Alaskan Yup’ik (Elena Charles, speaker)
_Cakma_ tbuat _tuntutuk_.
cakma tuai tuntu-te-u-k
down.there evidently moose-catch-indic.intransitive-3.DU
'Evidently they caught a moose down there.'

Derived verbs of this type may cooccur with independent nominals. The nominals may be of several kinds, including adjectives and de-}

(26) Central Alaskan Yup’ik (Elena Charles, speaker)
_tuntuq-curuq-megnuq_.
tuntuq-curuq-aqa-megnuq
moose-hunt-whenever-1.DU
'[We would enjoy ourselves] when we would go moose-hunting.

When new referents are introduced into discourse in Yup’ik, it is usually with an independent nominal. There are certain verbalizing suffixes, however, whose primary function is to indicate the presence or absence of entities, or to bring them onto the scene, such as _-tar_- ‘exist’, _-ngerr_- ‘have’, _-nge_- ‘acquire’, _-te_- ‘catch, get’, _-li_- ‘make’, and _-ngicag_- ‘lack’. These suffixes, which are in a sense pragmatically subordinate to the noun stems they occur with, do, on occasion, function to introduce referential entities to the discourse.

Additional discussion of referential properties of such constructions in Eskimo languages can be found in Sadock (1980; 1985) and Denny (1989).

Another construction based on derivational affixes rather than stems can be seen in languages of the Salishan and Wakashan families of Northwest North America. Verbs may contain derivational suffixes whose meanings are similar to those of nouns in other languages (Hagège 1977; 1978; 1980; Saunders & Davis 1975). The suffixes carry no number or case marking and never appear as independent nouns with articles, deities, or possessives. An example can be seen in (29). (29a) contains a verb and independent nominal, (29b) contains its counterpart with derivational suffix.

(28) Central Alaskan Yup’ik (Elena Charles, speaker)
_Tuntuq-gguq_.
tuntu-te-u-q=gguq
moose-catch-indic.intransitive=hearsay large-very-ABLATIVE
‘He got a moose, a big one.’

(b) /pax-ll-loun/
_hurt-throat-1.SUBJECT
'I have a sore throat.'

(29b) is the pragmatically unmarked idiomatic form, while (29a) is an emphatic form, with special emphasis on the separate constituents (Hagège 1978).

The derivational constructions of Eskimo and Salish were both specifically excluded from the category of noun incorporation by Sapir in 1911. As has been seen, both share some formal and functional features with prototypical incorporation, and both show some differences. Whether derivational constructions of these types should be grouped with incorporation must depend on the purpose of the grouping.

3. Some theoretical issues

Noun incorporation has been of theoretical interest because it is formally a morphological process with syntactic implications. It can
affect both the internal structure of words and the argument structure of clauses. There has thus been considerable discussion of its place in formal models of language. Some grammarians have focused their attention on the morphological side of the process, some on the syntactic side, and some on the interface between the two.

3.1. Morphology versus syntax
The implications of incorporation for a number of formal generative models have been examined. Within the framework of Relational Grammar, incorporation in Southern Tiwa, a Tanoan language of southwestern North America, has been cited as evidence for multiple levels of grammatical relations (Allen & Gardiner & Frantz 1984; Frantz 1985; 1990).

The derivational constructions of Greenlandic, along with incorporation in Southern Tiwa, provided a major impetus for the development of Autolexical Syntax (Sadock 1985). In this model, autonomous morphological and syntactic modules are postulated, each of which assigns a representation to every expression in the language. A major focus of the theory is the formalization of the interface between these components.

Incorporation has been treated in several ways within the framework of Government-Binding. One approach has taken the process to be an essentially syntactic one. Noun incorporation, passives, antipassives, impersonal constructions, causatives, clause union, applicatives, and dative shift are grouped together as results of “the syntactic movement of a word-level category from its base position to combine with another word-level category” (Baker 1988: 424). The process leaves behind a trace that must be properly governed. Constraints on the movement are explained in terms of the Empty Category Principle.

Another approach within the Government-Binding framework has been lexical (Rosen S. T. 1989). Here, noun incorporation is seen as the result of two separate word formation processes that apply in the lexicon, presyntactically. One affects the grammatical relations of the derived verb, the other does not.

3.2. Productivity and referentiality
The definition of incorporation as primarily a syntactic process has generally been based on its productivity and referential transparency (Sadock 1985; Baker 1988: 80). Both of these characteristics remain under discussion (cf. Art. 34).

The productivity of noun incorporation varies widely across languages. In some it is marginal: only a limited number of lexicalized noun-verb compounds exist. Yet noun stripping can be as productive as many other syntactic constructions.

Among languages with prototypical incorporation, those of the Iroquoian family are frequently cited as exhibiting particularly productive incorporation ( Sapir 1911; Baker 1988). Incorporation is indeed pervasive in connected speech, but it is productive in the way that highly derivational morphology is productive, not fully productive syntax (Mithun 1984; 1986a; 1986b). Speakers know not only which noun-verb combinations exist and which do not, they also know which ones could but do not. They notice the use of a combination they have not heard before, and remember occasions when they first heard neologisms. Furthermore, individual noun and verb stems vary in the frequency with which they appear in incorporating constructions.

In Baker’s model, noun roots are initially associated with an external noun phrase position, then adjoined to the verb by Move-Alpha, retaining their referential properties. It has often been pointed out, however, that incorporated nouns are not distinguished for referentiality (Mardirusian 1975; Woodbury 1973; Merlan 1976; Hagège 1977, 1978, 1980; Miner 1982; 1983; 1984; Mithun 1984; 1986a; 1986b).

One kind of evidence cited in support of the referentiality hypothesis comes from sentences like that in (30).

/Nô:nâ akwé: yo-státh-n n-d: n:nhst-c?/ sok n:wa/
when all N-dry-STATIVE the N-COM-NOMINAL:SUFFIX then now
‘When the corn was dry then it was time
/A-ta: akw-nnhst-arú:ko-c?/
FUT-REP-1.PL-corn-REMOVE:PFV
to shell it.’
It is assumed that incorporated nouns must be referential, since "the incorporated" N[oun] root 'corn' in the second clause seems to refer to the same ears of corn specified by the N[oun] Phrase] 'corn' in the preceding clause" (Baker 1988: 79).

An alternative view is that since the incorporated noun is not itself an argument, it is unspecified for referentiality. The corn to be shelled may be identifiable from inference but not grammar. It is seen as similar to the noun head of the English 'George has a headache'. There may be little doubt that the head that aches belongs to George, but the identification is deduced rather than specified.

A second kind of evidence for referentiality comes from sentences like that in (31), where an incorporated noun in Southern Tiwa is translated with a referential noun in English.

(31) Southern Tiwa (Allen & Gardiner & Frantz 1984: 297)
/vedi bi-musa-tuwi-ban/
those 1.sg/b-cat-buy/PAST
'I bought those cats.'

The incorporated noun is assumed to have been moved into the verb from an external noun phrase, retaining its referentiality and stranding the demonstrative.

An alternative view is that the referentiality comes from the demonstrative. In many languages, particularly those with incorporation, verbs can stand alone as grammatical clauses in themselves, as in the Tuscarora sentence in (32a). When independent noun phrases do occur, they may consist of a demonstrative, quantifier, adjective, noun, or any combination, as in (32b).

(32) Tuscarora (Elton Greene, speaker)
(a) /ʔ-ʔwá:人都í-káŋ/ FUTURE-2-PL-see-PFV
'You all will see (it).'
(b) /ʔ-ʔwá:人都í-káŋ/ kyeni:ká/ FUT-2-PL-see-PFV this
'You all will see it, this one.'
= 'You all will see this.'

Such noun phrases may appear with any verbs, including those containing incorporated nouns, as in (33).

(33) Tuscarora (Elton Greene, speaker)
/ʔ-k-ʔrwehθ-ʔ-ht hení:ká/ FUT-1-tail-be.down-CAUS that
'I'll tail-lower that one'
= 'I'll get that tail down.'

The Southern Tiwa example in (34) has the same structure.

That example is interesting for another reason. The pronominal prefixes refer to both the buyer ('I') and the bought. (Cats are of gender class b.) It might be thought that the incorporated noun 'cat' has triggered agreement. Pronominal reference is present whether nouns appear or not, however.

(34) Southern Tiwa (Rosen C. 1990: 672)
(a) /U-ide tow-wia-ban/
child-A 1.SG/C/A-give-PAST
'I gave them to the child.'
(b) /Tow-kuap-wia-ban/
1.SG/C/A-shoe-give-PAST
'I shoe-gave them to him'
= 'I gave the shoes to him/her.'

4. Diachrony

Noun incorporation, like most other grammatical structures, is not present or absent within a language for all time. Comparisons of genetically related languages show us that it can spring into being, develop, and fade over time.

4.1. Origins

A likely origin for incorporation is in stripping constructions. (Miner 1983; 1984; 1986; 1989; Mithun 1984; Schleicher 1989). As seen in 2.1, stripping shares a number of properties with prototypical incorporation. Over time, the phonological bond between elements of frequent collocations may become stronger, and the resulting compounds may serve as a basis for further compounding by analogy. Both stripping and loose incorporation have been identified in Zuni (Miner 1986), where stripping is reported to be more productive than incorporation.

Another diachronic source of incorporation may be backformation. A number of Germanic languages contain noun-verb compounds that initially appear to be the result of noun incorporation, such as English babysit, grocery shop, horseback ride. These English forms are in fact not the direct product of a process of incorporation (Sapir 1911; Hall 1956). They have resulted from backformation from nominal compounds of various sorts, particularly agentive nominals (babysitter) and gerunds (horsebackriding). Such backformation could provide a back door for the development of productive noun incorporation.
Weggelaar (1986) presents a list of 25 verb-noun compounds from Dutch that have full sets of finite forms. All of the incorporated nouns refer to body parts. As Booij (1992) points out, these probably arose from conversions of nominal (VN) compounds. Booij (1989) also observes that Dutch has another source of incorporating constructions not seen in English. Verbal infinitives can be used productively as the heads of NN compounds. These are then amenable to reinterpretation as the infinitival verbal elements of NV compounds.

4.2. Development

There is some evidence that incorporation may begin as a process of lexical compounding, whose primary function is to derive new terms for new concepts. It may then be exploited as a device for manipulating case roles within clauses, and then extended to a general discourse device for regulating the relative salience of nouns according to their pragmatic importance (Mithun 1984).

The process may arise repeatedly in the course of development of a language. Mayali shows an interesting multi-layer system (Evans 1996), in which a single verb may contain multiple incorporated nouns. Nouns in the position closest to the verb root form lexical compounds with it, characterized by the greatest phonological fusion and lexicalization. These formations are not considered productive. Nouns in positions further from the root enter into what are termed body part, generic, and adverbial incorporation respectively. These constructions, which show correspondingly less phonological fusion and greater productivity than the lexical compounds, are presumably more recent.

4.3. Demise

The process of incorporation may lose its productivity at any stage of development. Speakers may simply stop creating new noun-verb combinations. Those that are already lexicalized will of course remain in the language, but over time, regular processes of language change will obscure their origins. The shapes of incorporated nouns and their independent counterparts may diverge until their relationship is blurred. The meanings of noun-verb compounds may move away from the semantic sums of their components. Independent nouns and verbs may disappear from the language while compounds containing them remain, so that incorporated nouns and incorporating verbs no longer have independent counterparts at all.

There is ample evidence that incorporation can be among the first processes to disappear in language obsolescence (Mithun 1984). Classical Nahua exhibited extensive incorporation, and many of its descendants still do (Merlan 1976; Langacker 1979). Merlan notes its use for backgrounding and grounding elements in discourse in Huachtla Mexicano. In Malinche Mexican, which is under heavy Spanish influence, incorporation is reported to be quite rare, particularly for discourse purposes (Hill & Hill 1986). A comparison of the Tiwi (Australian) used by older and younger people reveals similar differences (Lee 1983). While traditional Tiwi showed extensive use of incorporation for both lexical derivation and discourse pragmatic purposes, it has nearly disappeared from the language after 70 years of contact with English. A similar difference is reported between two versions of Cayuga (Mithun 1989).

The demise of incorporation may be due to the formal complexity of the process, but the circumstances of contact may also play a role. The obsolescing languages in which the disappearance of incorporation has been documented are being replaced by more analytic languages, usually English or Spanish, which do not contain the construction.

4.4. Resurgence

Even after incorporation has ceased to be productive process, earlier incorporating constructions can give rise to productive derivative processes such as those in Eskimo-Aleut and Salishan described in 2.2 (Mithun 1998). Either the verbal element or the nominal element of compounds may be reanalyzed as an affix, like Yup’ik -cur ‘hunt’ and Comox -tat ‘throat’ and used in new constructions.

5. Areal extent

Noun incorporation has been most extensively documented in languages indigenous to North America. Among the North American families containing languages with incorporation are Algonquian, Iroquoian, Muskogean, Caddoan, Siouan, Kiowa-Tanoan, Uto-Aztecan, Zuni, Yana, Takelma, Salishan, Athabaskan, and Tsimshian. It is neither uni-
universal nor unique to North America, however. Among Meso-American languages containing the construction are Mayan, Totonacan, Mixtecan, Mixe-Zoque, and Tlapanae-Subtiaba. In South America are the Aru- wakan, Harakmbet, Panoan, Cayuvava, Tupi-Guarani, Mura, Cahuapan, Woarani, and Maipuran families. It is found in Siberia (Luoravetlan family), in Japan (Ainu), Austronesia, New Guinea, and Australia, particularly in non-Pama-Nyungan families. It appears in India among the Munda languages, and in North Africa in Cushitic languages.

This list is far from exhaustive. As spontaneous speech from more languages is documented, more incorporation will surely be discovered among the languages of the world, and we will learn more about the precise nature of the phenomenon.

6. Uncommon abbreviations

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
</tr>
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<tbody>
<tr>
<td>1.MIN</td>
<td>First person minimal</td>
</tr>
<tr>
<td>3.MIN</td>
<td>Third person minimal</td>
</tr>
<tr>
<td>DISTR.GEN.ASP</td>
<td>Distributive and general aspect</td>
</tr>
<tr>
<td>NOM.SUFF</td>
<td>Nominal suffix</td>
</tr>
<tr>
<td>PFV</td>
<td>Perfictive aspect</td>
</tr>
<tr>
<td>PI</td>
<td>Past imperfective aspect</td>
</tr>
<tr>
<td>PP</td>
<td>Postposition</td>
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</tbody>
</table>

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