2009. Polysynthesis in the Arctic. Variations on Polysynthesis: The Eskimo-Aleut Languages. Marc-Antoine Mahieu and Nicole Tersis, eds. Amsterdam: John Benjamins. 3-18.

CHAPTER 1

Polysynthesis in the Arctic

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Among the most frequently cited typological characteristics of American languages is *polysynthesis*, a term coined in 1816 by Duponceau to describe words in American languages containing large numbers of morphemes. Major scholars since that time, including Boas, Sapir, and Greenberg, have also described certain American languages as polysynthetic, citing Eskimoan languages as prime examples. Recently however, Baker specifically excluded Eskimoan languages from the class of polysynthetic languages on the grounds that they lack one of his criterial structures: noun incorporation. Here it is shown that Eskaleut languages contain constructions diachronically and functionally equivalent to prototypical noun incorporation, like that of Iroquoian. They differ in certain other respects because of the distinct diachronic pathways by which their modern sentence structures have developed.

Keywords: holophrasis, incorporation, productivity, pronominal affixes, Yup'ik

1. Introduction

It is generally assumed by scholars working with Eskaleut languages that these languages are robustly polysynthetic. Fortescue states, for example, that "Eskimo–Aleut is arguably the most polysynthetic family in the world" (2002: 257). Yet in a monograph devoted to the topic of polysynthesis, Baker takes the opposite view: "*Polysynthetic languages differ from* languages such as Chichewa, *Greenlandic*, Alamblak, and Yimas" (1996: 475). The radical difference in these assessments hinges on the definition of polysynthesis.

Polysynthesis is one of the oldest and most frequently cited of typological features. The Oxford English Dictionary provides an etymological definition: "Synthesis or composition of many elements; complex or multiple synthesis" (1971: 234). Greenberg, arguably the founder of modern linguistic typology, sought to refine the notion with a more rigorous method for classifying languages along the dimension of synthesis.

> The ratio M/W where M equals morpheme and W equals word, is a measure of this synthesis and may be called the synthetic index. Its theoretical lower limit is 1.00, since every word must contain at least one meaningful unit. There is no theoretical upper limit, but in practice values over 3.00 are infrequent. Analytic languages will give low results on this index, synthetic higher, and polysynthetic the highest of all. (1960: 185)

He illustrated the method by comparing 100-word samples from a variety of languages, noting that "*Eskimo* was selected as a representative *polysynthetic* language" (1960: 193). His Eskimo sample was Greenlandic, drawn from a text in Thalbitzer 1911. It scored the highest of all the languages tested, with an average of 3.72 morphemes per word. Work of this type arranges languages along a continuum, rather than into discrete classes. It raises the question of whether there is anything typologically significant about polysynthetic languages beyond a position along a cline. Do languages above a certain score share other typological features? Would German qualify as polysynthetic because of its propensity for noun compounding?

The term "polysynthesis" was actually first coined by Peter Stephen Duponceau in 1816 in a letter to John Heckewelder, where he stated that "Crantz and Egede prove in the most incontrovertible manner that the language of Greenland is formed on the same syntactic or polysynthetic model [as Delaware, Chippewa, and Natick]" (Letter XXIII, p. 430). In a report to the American Philosophical Society published in 1819, Duponceau laid out more specifically the features he saw as fundamental to the polysynthetic type, mentioning both compounding and amalgamation into one verb of what is conveyed by separate words of various parts of speech, in other languages.

> A *polysynthetic* or syntactic construction of language is that in which the greatest number of ideas are comprised in the least number of words. This is done principally in two ways.
>
> 1. By a mode of *compounding* locutions which is not confined to joining two words together, … but by interweaving together the most significant sounds or syllables of each simple word, so as to form a compound that will awaken in the mind at once all the ideas singly expressed by the words from which they are taken.
> 2. By an analogous combination [of] the various parts of speech, particularly by means of the verb, so that *its various forms and inflections will express not only the principal action, but the greatest possible number of the moral ideas and physical objects connected with it*, and will combine itself to the greatest extent with those conceptions which are the subject of other parts of speech, and in other languages require to be expressed by separate and distinct words. Such I take to be the general character of the Indian languages.

Other leading scholars of American languages echoed Duponceau's criteria for polysynthesis. Nearly a century later, Franz Boas cited the combination of many ideas into a single word and pointed specifically to Eskimo (Greenlandic) as a prototypical example of a polysynthetic language.

> In *polysynthetic* languages, a large number of distinct ideas are amalgamated by grammatical processes and form a single word, without any morphological distinction between the formal elements in the sentence and the contents of the sentence. …
>
> An example of what is meant by polysynthesis is given, for instance, in the following *Eskimo* word: *takusariartorumagaluarnerpâ?* 'Do you think he really intends to go to look after it?' (1911: 74)

Boas's student Edward Sapir similarly cited a high average number of morphemes per word in his definition of polysynthesis, along with the specification of syntactic relations encoded within the word. He, too, pointed to Eskimo as a prototypical example of polysynthesis.

> A *polysynthetic* language, as its name implies, is more than ordinarily synthetic. The elaboration of the word is extreme. Concepts which we should never dream of treating in a subordinate fashion are symbolized by derivational affixes or "symbolic" changes in the radical element, while the more abstract notions, including the syntactic relations, may also be conveyed by the word. (1921:128)

> *Eskimo*, a language particularly rich in suffixes that verbify nouns, has been termed polysynthetic . . . (1911:254/1990:31)

In his book *The Polysynthesis Parameter*, Baker specifies two features he deems criterial for polysynthesis. For him, languages are polysynthetic if and only if they contain both noun incorporation and "agreement", the specification of grammatical relations in the verb (1996:19). In another work he cites Mohawk, an Iroquoian language of northeastern North America, as a prototypical polysynthetic language, noting that "[b]y winning the 'different from English' crown, Mohawk also gains a new opportunity: the privilege of being a testing ground for the ideas we have been exploring about language and parameters" (2001:86). In their introduction to a collection of articles on polysynthesis, Evans and Sasse cite all of the features mentioned by these authors, with special reference to the two deemed crucial by Baker (2002:2).

> Polysynthetic languages represent, in a single verbal word, what in English takes an entire multi-word clause. They achieve this by using pronominal affixes for some arguments, and incorporated nouns for others.

The essence of polysynthesis thus appears to have been understood as the expression of many "ideas" in a single word, ideas that would be expressed by separate words in other languages. Two kinds of structures have been cited as contributing to such an arrangement: (i) noun incorporation and (ii) the expression of syntactic relations within the verb via pronominal affixes. In what follows, the import of each of these structures will be examined in turn.

2. Polysynthesis and incorporation

Incorporation has traditionally been understood as the compounding of a noun stem with a verb stem to form a new verb stem. (The term has occasionally been used more broadly for any morphological amalgamation, or the fusion of any morphemes conveying ideas that would be expressed in separate words in languages

like English.) It has not always been considered necessary for polysynthesis, however. Daniel Brinton, in an 1885 paper published in 1890 "Some characteristics of American languages", specifically called for their separation.

> I believe that for the scientific study of language, and especially of American languages, it will be profitable to restore and clearly to differentiate the distinction between polysynthesis and incorporation (1890: 392)

Boas also distinguished the two. After describing polysynthesis, he turned to incorporation.

> American languages have *also* been designated as *incorporating* languages, by which is meant a tendency to incorporate the object of the sentence, either nominal or pronominal, in the verbal expression (1911: 74)

Sapir likewise separated them, characterizing Eskimo as polysynthetic but not incorporating. The passage cited above continues as follows.

> *Eskimo*, a language particularly rich in suffixes that verbify nouns, has been termed *polysynthetic*, but has *not* been employed by serious students as a source of examples of *noun incorporation*. (1911: 254/1990: 31)

Baker, however, sees incorporation as criterial, and its absence from the Eskaleut languages as grounds for their exclusion from his class of polysynthetic languages.

We may consider noun incorporation to be "robust" in a language if: . . .

> Both the noun root and the verb root can, in general, be used independently [Criterion (d)] . . .Criterion (d) *excludes* languages like those of the *Eskimoan* family… (1996: 19)

> These [the *Eskimoan*] languages appear *not* to be *polysynthetic* in the technical sense of being subject to the Morphological Visibility Condition [Polysynthesis Parameter]; rather, they differ from languages like Mohawk in a cluster of ways. (1996: 362)

2.1. The construction

As prime examples of polysynthetic languages with incorporation, Boas, Sapir, and Baker all cite those of the Iroquoian family: "No more thorough-going instance of a noun-incorporating language can be required than *Iroquois*" (Sapir 1911: 275/1990: 34). An example of incorporation in Mohawk, an Iroquoian language of Quebec, Ontario, and New York State, is in (1).

(1) Mohawk noun incorporation (Josephine Horne, speaker p.c.):
kahkwennión:ni
k -ahkwenni-onni
1s.a-clothing -make.stative
'I'm making clothes.'

Eskaleut languages do not show any root-root or stem-stem compounding: words are built on one and only one root. They do, however, show constructions that are strikingly similar to that in (1).

(2) Central Alaskan Yup'ik (Elena Charles, speaker p.c.):
irniarualiunga
irniaruqa-li -u -nga
doll -make-INTR.IND-1S
'I'm making dolls.'

Formally, the two constructions differ in a clear way. The Mohawk morpheme *-onni* 'make' is a verb root. The Yup'ik morpheme *-li-* 'make' is a derivational suffix. Roots and suffixes show clear formal differences in both Iroquoian and Eskaleut languages (Mithun 1998).

In Yup'ik, roots always occur word-initially; suffixes never do. Roots can serve as words alone or with just inflectional endings; suffixes can never constitute words on their own or serve as the basis of words with inflectional suffixes. Roots constitute an open class of morphemes, to which new items are frequently added through borrowing; the suffix class is closed.

On strictly formal grounds, Yup'ik and other Eskaleut languages lack the prototypical noun incorporation structure of Iroquoian languages. Yet on other grounds, (1) and (2) have much in common.

2.2. Semantics

There are strong semantic parallels between the two constructions. We normally expect the meanings of affixes to be relatively abstract or "grammatical", like those of causatives or conditionals. Many suffixes of this type exist in Yup'ik, but many others show surprisingly concrete meanings, the kind associated with roots in other languages.

(3) Some Yup'ik suffixes with verb root-like meanings (Jacobson 1984):

-cur-	'hunt, seek, check'	*-nge-*	'acquire'
-kliute-	'acquire, claim as own'	*-karci-*	'buy'
-laar-	'get a new'	*-ci-*	'buy'
-tur-	'eat, wear, use'	*-te-*	'catch'
-lgir-	'take along'	*-liqe-*	'catch a lot of'
-ssaag-	'fetch from accessible place'	*-tar-*	'fetch from nature'
-li-	'make'	*-kiur-*	'prepare'

2.3. Syntax

There are syntactic parallels as well. It has sometimes been proposed that in prototypical noun incorporation such as that in Mohawk, the incorporated noun represents a syntactic direct object. Often the English translations of the Yup'ik structure contain direct objects.

(4) Translation of Mohawk with English direct object:
katenawiróhare'
k -ate -nawir-ohar -e'
1S.A-MIDDLE-tooth-wash-STATIVE
'I'm brushing my teeth.'

(5) Translation of Yup'ik with English direct object:
kegguteliurtua
keggute-liur -tu -a
tooth -dealing.with-INTR.IND-1S
'I'm brushing my teeth.'

But not all Mohawk incorporated nouns are translatable as objects. Yup'ik root-suffix combinations show similar patterns.

(6) Other roles

a. Mohawk
seksa'tí:io
se -ksa't -iio
2S.A-child-be.good.STATIVE
'You're a good girl.'

b. Yup'ik
uinguuq
ui -ngu-u -q
husband-be -INTR.IND-3S
'He is a husband = is married.'

Mohawk noun incorporation is not restricted to nouns functioning as direct objects or even semantic patients. It is not simply a matter of translation. The last two words below are based on the same verb root.

(7) Mohawk incorporated nouns with other roles:

kahserie'táneren'	'It is string-tied' = 'it is tied up with string.'
ra-hsharí:ne'	'He is leash-leading it, leading it on a leash.'
onke'nionhsókha'	'I nose-leak' = 'My nose is running.'
rahonwì:sere'	'He was container-dragged = driving by.'
tentewaronta'serónnion'	'We'll log-build it, build it out of logs.'
ratiia'titáhkhe'	'They are body-moving' = 'they are riding.'
tahonathahitáhkhe'	'They are road-moving, walking along.'

As in all compounding, the construction does not specify syntactic function. The incorporated noun qualifies the verb in an unspecified way. The Yup'ik root-suffix

constructions show similar ranges of semantic relations. The construction itself does not specify a syntactic role.

(8) Yup'ik (Jacobson 1984: 447, 448, 451):

neqerrlugcugninarquq	'It dried.fish-smells, smells of dried fish.'
aqsaculnguunga	'I'm stomach indisposed, have stomachache.'
maagguirtuq	'He is here going by way of, along this route.'
keglunerngariuq	'It's wolf-beginning to be, becoming wolf-like'
puyirtuq	'It is smoke-occurring, it is smoky.'
atsirtuq	'It is berry-provided with.'

Both Mohawk and Yup'ik complex verb stems, originally composed of a noun stem plus verb root (Mohawk) or suffix (Yup'ik), can occur with additional independent lexical arguments, which may or may not be related to the incorporated noun.

(9) Mohawk co-occurrence with lexical nominal:

onòn:ta'	*wa'khnekì:ra'*
o-non't-a'	wa' -k -hnek -ihr -ha'
N-milk -NOUN.SUFFIX	factual-1S.A-liquid-consume-IPFV
milk	I liquid-consumed

'I liquid-consumed milk' = 'I drank milk.'

(10) Yup'ik cooccurrence with lexical nominal (Elena Charles, speaker p.c.):

qantangqelalriit	*angelrianek*
qantar-ngqerr-lar -lria -t	ange -lria -nek
bowl -have -habitually-PTCP-3p	be.big-NMLZ-PL.ABL
they bowl have	big ones

'They have large bowls.'

2.4. Morphology

There are morphological parallels between the Mohawk and Yup'ik constructions as well. The noun stems in both carry no markers of syntactic relationship such as case or possession, and no indications of number or definiteness. They are not themselves inflected, in keeping with their role as modifiers rather than arguments.

2.5. Productivity

It has been claimed that noun incorporation is a syntactic process and assumed to be fully productive, in much the same way as English relative clause formation. If this is true, incorporation should be fully acceptable with all noun-verb combina-

tions that make sense. Mohawk incorporation is certainly pervasive: it is frequent in speech and involves large numbers of nouns and verbs. New formations occur. It is not, however, fully productive in the ways of such syntactic constructions. In Mohawk, noun and verb stems show individual ranges of productivity with respect to incorporation. Some verb stems never incorporate, such as *-ahskat-* 'be nice, pleasant'. Some verb stems occur in only a few incorporation constructions, such as *-ken* 'see'. Some verb stems incorporate nouns within a restricted semantic domain, such as *-nonhwak-* 'hurt'. Many verb stems incorporate frequently. Some are so productive that speakers barely notice new formations. Some never occur even without an incorporated noun, such as *-iio* 'be nice, pleasant'. We can see that this is not merely a semantic issue: the verb root *-ahskat-* which never incorporates, and the verb root *-iio* which always incorporates, have the essentially the same meaning: 'be nice, pleasant'.

The Yup'ik stem-suffix construction shows a similar profile. It is pervasive in speech and occurs with a large variety of stems and suffixes. Even borrowed nouns enter into the construction, as in (11).

(11) Yup'ik productivity (Elena Charles, speaker p.c.):
suupiluki
soup-li -lu -ki
soup-make-SUB-3p
'I make soup out of them.'

But the productivity is not tied to the construction as a whole; each suffix has its own degree of productivity. The assessments of productivity in (13) are from Jacobson (1984).

(12) Ranges of productivity (Jacobson 1984):
a. Non-productive: *-ngtak* 'to be very N, to have much N'
'Non-productive; applies only to humans." (1984: 518)
uquq 'fat' *uqungtagtuq* 'He is very fat.'
b. Restricted domain: *+gguir-* 'to go by way of N, to go through N'
'Used with demonstrative adverb bases.' (1984: 451, 435)
maa(ni) 'here' *maagguirtuq* 'He is coming along this route.'
c. Very productive: *+ci-* 'to buy some N'
mukaaq 'flour' *mukaarciuq* 'She is buying some flour.'
No mention of restrictions on productivity (1984: 441).

The range is typical of derivational affixes in all languages, like the differences among English *-let*, *-ness*, and zero derivation (conversion).

There are also similarities in the kinds of meanings of morphemes that enter

into the constructions in the two languages. In Mohawk, as in many languages with incorporation, nouns referring to body parts are often incorporated in constructions like those in (13).

(13) Mohawk incorporation of body-part nouns:

a. *wakenonhwaranòn:waks*
wake-nonhwar-a -nonhwak-s
1S.P -brain -JR-hurt -IPFV
'I brain-hurt.' = 'I have a headache.'

b. *wahonwahsí:nia'ke'*
wa -honwa -hsin-ia'k-e'
FACTUAL-INDF/M.SG-leg -cut -PFV
'They leg-cut him.' = 'They amputated his legs.'

Semantically similar constructions occur in Yup'ik.

(14) Yup'ik suffixes on body-part nouns (Jacobson 1984: 439, 458, 459):

a. *it'gaca'artaa*
it'ga-ca'art-a -a
foot-hit -TR.IND-3S/3S
'He hit it right in the foot.'

b. *ciutairtua*
ciut-air -tu -a
ear -be.cold.in-INTR.IND-1S
'My ears are cold.'

The addition of a body-part term to the verb semantics permits the affected individuals (body-part owners) to assume core argument status.

2.6. Lexical functions

As word-formation devices, the constructions in both languages are used to form new vocabulary for nameworthy concepts. In (7) above, we saw *-ia't-titahkhe-* 'body-move' = 'ride' and *-hah-itahkhe-* 'path-move' = 'walk'. Each has a meaning not completely predictable from its parts. Similar expressions are pervasive in Yup'ik. Speakers recognize the difference between possible and actual formations. The Yup'ik suffix *-tur-* 'eat, wear, use' is relatively productive. Speaker George Charles was asked about the invented form in (15). Though the word would make sense, he did not recognize it as part of his vocabulary.

(15) Possible Yup'ik word
**neqturtuq.* (Asked about as possible word)
neqe-tur-tu -q
fish -eat-IND-3S
?'He's eating fish.'

George Charles, speaker p.c.: "Eating fish … That's the impression I'm getting. It almost could be. You know, it sounds pretty right to me for some reason. That's one thing about Yup'ik, you can create new words."

2.7. Discourse functions

Incorporation is also used in Iroquoian languages to provide speakers with alternative expressions for manipulating the flow of information. One way of introducing new referents is to incorporate them into presentative verbs, verbs with little meaning beyond simply indicating the presence, absence, arrival, or departure of a referent. In such contexts, these "light" verb roots do not supply sufficiently significant information of their own to merit expression as separate words. Such a construction can be seen in (16), the first mention of money in this stretch of speech.

(16) Mohawk light verb (Watshenní:ne Sawyer, speaker p.c.):
thó ne: ki: iáh é:so teionkwahwistaien'
tho ne: ki: iáh é:so te -ionkwa-hwist -a -ien -'
there it.is this not much NEG-1P.P -money-JR-have-STATIVE
'At that time, we didn't have much money.'

Among the Yup'ik suffixes are a large number with meanings similar to the Mohawk light presentative verbs.

(17) Yup'ik suffixes of presence and absence

-tar-	'exist'	*-llite-*	'encounter'
-ngqerr-	'have'	*-lir-*	'have lots of'
-nge-	'acquire'	*-ksagute-*	'acquire'
-kliute-	'have taken possession of'	*-li-*	'make'
-kiur-	'prepare'	*-kite-*	'supply'
-ngir-	'be deprived of, remove'	*-lgir-*	'take along'
-ngicag-	'lack, need'	*-ngite-*	'have no'

An example of a Yup'ik presentative construction is in (19). Here the point of the sentence was to introduce the boat, not discuss possession.

(18) Suffix *-ngqerr-* 'have' (Elena Charles, speaker p.c.):
icugg, Frankie angyangqerrlu-ni
icugg Frankie angya-ngqerr-lu -ni
remember Frankie boat -have -SUB-3S
'Remember, Frankie had a boat.'

2.8. Iroquoian noun incorporation and Eskaleut derivation

We have seen that, strictly speaking, the Eskaleut languages lack a formal equivalent of Iroquoian noun incorporation. There is no root-root or stem-stem compounding. But they do contain stem-suffix constructions that are strikingly similar to incorporation in most ways.

The components of Iroquoian incorporation constructions are drawn from the full nominal and verbal lexicon. The components of the Eskaleut derivational constructions are drawn from the full noun stem lexicon but a closed set of suffixes, though this set is surprisingly large. In both languages, the productivity of the construction varies with the specific productivity of the individual stems or suffixes.

Both constructions are used to form lexical items, which vary in their strength of lexicalization. In both, the noun stems are not core arguments and have no syntactic status, but both are exploited to manipulate argument structure. Both provide speakers alternatives for packaging information in discourse.

Surely the similarities are no accident. The Eskaleut noun-suffix constructions must have originated as noun incorporation. Over time, the unstressed second members of such constructions, verb roots, lost their individual salience and began to erode further in form. Morphemes which occurred particularly often as second members came to be reinterpreted as suffixes and were extended as such to new formations.

The origin in noun-verb compounding explains the often concrete meanings of the suffixes and their vast number. It also explains the functional parallelism of the constructions with incorporation proper. Traces of the lexical origins of a few suffixes can still be discerned.

(19) Some root-suffix similarities: Fortescue *et al.* (1994)

Proto-Eskimoan root	**atur-*	'use, wear, sing'
Yup'ik root	*atur-*	'eat, wear, use, have'
Yup'ik suffix	*-tur-*	'use, wear, sing'
Proto-Eskimo–Aleut root	**u-*	'be'
Attuan Aleut root	*u-*	'be'
Proto-Eskimoan suffix	**-u*	'be'
Yup'ik suffix	*-u-*	'be'

3. Pronominal affixes and holophrasis

The second criterion proposed for polysynthesis is expression of argument structure within the verb. Eskimo–Aleut verbs, like Iroquoian verbs, contain referential

pronominals (Mithun 2003). Their presence insures that every finite verb can constitute a full sentence in itself, complete with predicate (the verb stem) and all core arguments (the pronominal affixes). This feature was termed *holophrasis* by Lieber (1853: 346–9). At issue is whether such a feature has any implications beyond itself for structure elsewhere in the grammar. A number of linguists have expressed the sentiment that it does. Von Humboldt (1836: 192):

> Die Sprachen, welche auf diese Weise die Gränzen der Wort- und Satzbildung in einander überführen, pflegen der Declination zu ermangeln, entweder gar keine Casus zu haben …
>
> Languages which in this way run the boundaries of word- and sentence-formation into each other are commonly wanting in declension, and have no case at all, … (1999: 136)

Brinton ([1885]/1890: 353) on Humboldt:

> Outside of the verbal thus formed as the central point of the sentence, there is no syntax, no inflections, no declension of nouns or adjectives.

These descriptions certainly characterize Iroquoian languages. Iroquoian languages indeed show no noun case and no syntactically based constituent order, no formal links among sentential elements.

The descriptions do not, however, characterize Eskaleut languages, which have elaborate nominal case systems and a discernible basic, if manipulable, syntactically defined constituent order. Syntactic relations between predicates and their arguments, be they nominal or clausal, are consistently specified formally. The result is that the grammars of the Eskaleut languages differ from languages like those of the Iroquoian family in a fundamental way. The difference is independent of noun incorporation.

The differences stem from the different paths by which the two clause structures apparently developed. Modern Iroquoian clause structures appear to have arisen from earlier pragmatically marked constructions (Mithun 2007) common in many languages. Sentences involving a shift to a different but accessible topic (topicalization) consisted of an initial topic constituent with its own prosodic contour, followed by a pitch reset and the nuclear clause containing a resumptive pronoun: *George, he never wants to go anywhere*. Various focus constructions consisted of an initial focused element, pronounced with particularly high pitch, followed by the nuclear clause: *THE BUTLER did it*, *It was the BUTLER who did it.* Antitopic constructions consisted of a nuclear clause followed by a nominal, typically pronounced with low, flat pitch and perhaps creaky voice, confirming or clarifying a topic already in play: *She's a good cook, my mother*. As such structures increased in frequency, their pragmatic markedness declined. Unstressed pronouns representing core arguments in the original nuclear clauses, consistently positioned im-

mediately before the verb, fused with it as pronominal affixes. The modern verb word is thus the descendant of the original nuclear clause. More loosely attached topic, focus, and antitopic nominals outside of the nuclear clause were unmarked for case and their order reflected information structure rather than grammatical relations.

The modern Eskimoan clause structures can be seen to have come about by a different route, at least in the most recent stages (Mithun 2008). As in many languages, dependent clauses were formed by various nominalization constructions. One argument of such constructions was expressed by a possessive form, along the lines of *His rushing off annoyed me* or *I hate Sam's driving alone*. Such dependent clauses came to be used as independent sentences for various rhetorical purposes, eventually replacing them. Most of the modern indicative mood suffixes can be traced to nominalizers which still persist as such. In indicative clauses in the modern languages, the forms of the ergative case suffixes are the same as the genitive, and the forms of ergative pronominal suffixes on verbs match the possessive suffixes on nouns. The relations between predicates and arguments are thus still marked formally.

4. Eskaleut languages and polysynthesis

Typological features are more interesting if they correlate with other features. If polysynthesis is defined as having many morphemes per word, Eskaleut languages are clearly polysynthetic, just like Iroquoian languages, if not more so. This feature does indeed correlate with other characteristics of languages from both families. When multiple elements are combined into a single word, none can be given special prominence through moveable stress. Stress is determined purely phonologically. Alternative means of indicating information structure are necessary, and here polysynthetic languages offer a special resource: the alternation between expressing ideas in bound morphemes and in separate words.

Major differences between languages of the two families cannot be attributed to the presence or absence of noun incorporation. Though the Eskaleut languages do not show noun incorporation in the strictest formal sense (noun-verb compounds), they show noun-suffix structures apparently recently descended from noun incorporation, which have all of the same attributes and functions of Iroquoian incorporation. Both sets of languages also specify syntactic relations with pronominal affixes within the verb and are thus holophrastic: a verb can constitute a fully grammatical sentence on its own.

Significant typological differences between the two come from the diachronic routes by which their modern sentence structures came into being. While the

Iroquoian structures are apparently descended from focus, topic, and antitopic constructions containing lexical nominals outside of the nuclear clause, the Eskaleut structures are descended from nominalized clauses whose core arguments, originally marked as possessors, were and remain within the nuclear clause. As a result, Iroquoian nouns have no markers of syntactic relations such as case, and no syntactically based word order. Eskimoan languages differ on both of these points, with extensive case marking and a discernible syntactically based constituent order.

In the end, both noun incorporation (current or former) and pronominal affixes contribute to the average number of morphemes per word in these languages, but neither completely determines the typological character of the languages.

Abbreviations

1s, 1p	first-person singular, plural
2s, 2p	second-person singular, plural
3s, 3p	third-person singular, plural
A	agent
ABL	ablative
IND	indicative
INDF	indefinite person
INTR	intransitive
IPFV	imperfective
JR	joiner
M	masculine
N	neuter
NEG	negative
NMLZ	nominalizer
P	patient
pc	personal communication
PFV	perfective
PTCP	participial
SG, PL	singular, plural
SUB	subordinative
TR	transitive

References

Baker, M. 1996. *The Polysynthesis Parameter*. Oxford: OUP

Baker, M. 2001. *The Atoms of Language*. New York, NY: Basic Books.

Boas, F. 1911. Introduction. In *Handbook of American Indian Languages*. BAE-B 40.1. Washington, DC: Smithsonian Institution.

Brinton, D. G. 1890. Some characteristics of American languages. In *Essays of an Americanist*, 349–89. Philadelphia, PA: Porter and Coates.

Duponceau, P. S. 1816. Letter to John Heckewelder. In *A Correspondence between the Rev. John Heckewelder, of Bethlehem, and Peter Duponceau, Esq.* 11. Philadelphia, PA: American Philosophical Society.

Duponceau, P. S. 1819. Report of the corresponding secretary. Read 12th January, 1819. *Transactions of the Historical and Literary Committee of the American Philosophical Society*. I.

Evans, N. & Sasse H. J. 2002. Introduction: Problems of polysynthesis. In *Problems of Polysynthesis*. N. Evans & H. J. Sasse, (eds), 1–13. Berlin: Akademie Verlag.

Fortescue, M. 2002. The rise and fall of polysynthesis in the Eskimo–Aleut family. *Sprachtypologie und Universalienforschung.* Beiheft 4: 257–75.

Fortescue, M., Jacobson S. A. & Kaplan L. 1994. *Comparative Eskimo Dictionary.* Fairbanks, AL: Alaska Native Language Center.

Greenberg, J. 1960. A quantitative approach to the morphological typology of languages. *International Journal of American Linguistics* 26: 178–94.

Humboldt, W. von 1836. *Über die Verschiedenheit des menschlichen Sprachbaue.* Berlin: Königlichen Akademie der Wissenschaften. Translated 1999 by P. Heath as *On Language.* Cambridge.

Jacobson, S. A. 1984. *Yup'ik Eskimo Dictionary*. Fairbanks, AL: Alaska Native Language Center.

Lieber, F. 1853. The plan of thought in American languages. In *History and Statistics of the Indian Tribes of the United States.* H. r. Schoolcraft, (ed.), 2: 346–9 Washington DC.

Mithun, M. 1998. Yup'ik roots and affixes. In *Languages of the North Pacific Rim* 4, O. Miyaoka & M. Oshima (eds), 63–76. Kyoto, Japan: Kyoto University Graduate School of Letters.

Mithun, M. 2003. Pronouns and agreement: The information status of pronominal affixes. *Transactions of the Philological Society* 101(2): 235–78. London: Blackwell.

Mithun, M. 2007. Typological intersections: Prosody, morphology, and syntax. Hale lecture, LSA Linguistic Institute, Stanford University CA.

Mithun, M. 2008. The extension of dependency beyond the sentence. *Language* 83: 69–119.

Oxford English Dictionary, compact edition. 1971. Oxford: OUP.

Sapir, E. 1911/1990. The problem of noun incorporation in American languages. *American Anthropologist* 13: 250–82. Reprinted in *The Collected Works of Edward Sapir*, W. Bright (ed.), 5: 27–59. Berlin: Mouton de Gruyter.

Sapir, E. 1921. *Language*. New York, NY: Harcourt, Brace.

Thalbitzer, W. 1911. Eskimo. In *Handbook of American Indian Languages*. F. Boas (ed.), 967–1069. Bureau of American Ethnology Bulletin 40(1). Washington, DC: Smithsonian Institution.