

- Nair, V.S. 1979. 'A note on the language of Jarawas'. *Bulletin of the Anthropological Survey of India* 28:3-4, 17-38.
- Nichols, Johanna. 1992. *Linguistic diversity in space and time*. Chicago: The University of Chicago Press.
- Nigam, R.C. 1969. 'Report on field investigations on 'Onge speech' (1955-56)'. *Bulletin of the Anthropological Survey of India* 12:3-4, 127-45.
- Portman, M.V. 1887. *A manual of the Andamanese languages*. London: W.H. Allen & Co.
- Portman, M.V. 1898. *Notes on the languages of the South Andaman group of tribes*. Calcutta: Office of the Superintendent of Government Printing.
- Radcliffe-Brown, A.R. 1914. 'Notes on the languages of the Andaman Islands'. *Anthropos* 9, 36-52.
- Radcliffe-Brown, A.R. 1933. *The Andaman islanders* (reprint). Cambridge: Cambridge University Press.
- Singh, Raghubir. 1975. 'The last Andaman islanders'. *National Geographic* 148:1, 66-91.
- White, J. Peter & J.F. O'Connell. 1982. *A prehistory of Australia, New Guinea and Sahul*. Sydney: Academic Press.
- Zide, Norman & V. Pandya. 1989. 'A bibliographic introduction to Andamanese linguistics'. *Journal of the American Oriental Society* 109, 639-51.

## Noun incorporation in Hopi\*

Claire Gronemeyer

### Introduction

This paper examines Noun Incorporation (NI) in Hopi and presents evidence that Hopi has Type IV noun incorporation according to the typological classification presented in Mithun 1984. The incorporated noun (IN) is visible to discourse reference, NI can strand modifiers, and the IN can have a classificatory function. Hopi thus fulfills the criteria for a syntactic analysis as proposed in Baker 1988, 1995. However, the claim that word formation actually occurs in the syntax has been controversial and is challenged by a number of lexicalists (e.g. Rosen, Mithun). The arguments crucially weigh on the Lexicalist Hypothesis and the division of labour between the morphology and the syntax. Both the syntactic and the lexical approaches seem to account for the basic facts of NI, but significant differences arise on closer examination. The goal of this paper is to contribute some previously unknown data to the current discussion of this rather unusual morphological process and to consider possible analyses of the data. Furthermore, a brief overview of the polysynthetic properties of Hopi is presented to see whether these tendencies may account for NI in Hopi. Except when indicated, all the examples used in this paper are taken directly from *The Hopi dictionary* (Hill et al. in press).

### General properties of Hopi

Hopi is a Uto-Aztecan language spoken in Northern Arizona. Word order is predominantly SOV, although some scrambling may occur for discourse reasons. The Hopi case system includes the unmarked or nominative case for subjects and the marked or accusative case in all other positions; the oblique cases are marked by postpositions. The grammar distinguishes

\*This article developed out of a course paper written during the LSA Linguistic Institute 1995. I wish to thank Mark Baker, Ken Hale, and LaVerne Jeanne for their comments on and discussions of this topic during those courses. My gratitude also extends to the IDO fund which supported my participation in the Linguistic Institute and to the research project Parametric Typology (funded by Riksbankens Jubileumsfond) which has provided the financial support necessary to continue this research.

singular, dual and plural nouns, although only animate nouns are marked dual. To oversimplify, nouns are marked for a singular – non-singular distinction while verbs are marked non-plural – plural; compare (1) and (3). The combination of a non-singular noun and a non-plural verb is thus dual, as in (2). These examples are from Jeanne 1978:73.

- |     |  |                              |
|-----|--|------------------------------|
| (1) | mi' maana paki<br>that girl enter.PRF          | 'The girl entered.'          |
| (2) | mima maanat paki<br>those girls.DU enter.PRF   | 'Those (two) girls entered.' |
| (3) | mima mamant yiingya<br>those girls.PL enter.PL | 'Those girls entered.'       |

The verb thus shows agreement with its subject in number but not in person. Agreement with the number of a direct object is also marked although not all verbs have the morphological forms to mark this category. Although the verbal agreement system is not especially rich, it is sufficient to license null subjects in the third person. Abstracting away from many important details, the systems of tense and aspect interact in the following way: verbs are marked as either future or non-future and as perfective or imperfective; a perfective, non-future verb indicates the past tense. Perfective is generally the morphologically unmarked aspect (Jeanne 1978:163-8) and imperfective is signaled by a suppletive form or by a verbal suffix. Hopi has a switch-reference system in which adjoined clauses are marked for whether or not the subordinate subject is coreferential with the main clause subject. Complement clauses are essentially nominalized sentences.

### Noun incorporation

NI is the process whereby a noun in direct object position is morphologically integrated into its governing verb forming a complex verb of the form [N-V]. Compare the analytic Hopi sentence in (4) with the synthetic variant in (5).

- |     |  |  |
|-----|--|--|
| (4) | Pas nu' pu' wuko-taqa-t kaneelo-t niina<br>prt I then big-man-ACC sheep-ACC kill | 'I killed a big male sheep this time.' |
| (5) | Itam taavok kanel-nina-ya<br>We yesterday sheep-kill-pl:S                        | 'We killed a sheep yesterday.'         |

The IN in (5) loses its case and number morphology and directly precedes the verbal root. The resulting complex verb may be either transitive or intransitive depending on the language and the individual verb.

For NI to be considered a productive process rather than a lexical artifact, an analytic construction with the same roots should be available as in (4), and the meaning of the N-V should be transparent. Examples like English 'baby-sit' are thus excluded as unproductive and nontransparent.

*Typological properties.* The morphological phenomenon of NI as N-V compounding is found in many languages, but its syntactic behavior differs widely cross-linguistically. Mithun 1984 offers a typological overview of the NI alternation and divides languages into four groups according to functional criteria.

Type I NI is lexical compounding and is found in Oceanic, Mayan, Aborigine, Turkish, and English among others. A generic noun adjoins to the verb and specifies its meaning, and the process has a detransitivizing effect. In Type I incorporation, either ordering of N and V occur, but the IN always loses its inflection and becomes more closely integrated with the verb. Consider the Mokilese examples in (6) and (7), from Harrison 1976.

- |     |   |                                 |
|-----|---|---------------------------------|
| (6) | Ngoah kohkoa oaring-kai.<br>I grind coconut-these | 'I am grinding these coconuts.' |
| (7) | Ngoah ko oaring.<br>I grind coconut               | 'I am coconut-grinding.'        |

These compounds express conventionalized activities; the IN is generic and cannot receive a referential interpretation. If the referent is new, an independent NP must be used.

Type II NI is used to manipulate the case marking of various participants in a sentence, thus it is relevant to the verb and its internal arguments. Consider (8) and (9) from Yucatec Mayan, from Bricker 1978.

- |     |  |                                    |
|-----|--|------------------------------------|
| (8) | k-in-č'ak-Ø-k če' ičil in-kool<br>INCOMP-I-chop-it-IMPF tree in my-cornfield | 'I chop the tree in my cornfield.' |
| (9) | k-in-č'ak-če'-t-ik in-kool<br>INCOMP-I-chop-tree-TR-IMPF my-cornfield        | 'I clear my cornfield.'            |

After NI, the direct object slot is left open, and an oblique NP can be promoted to direct object status while the demoted direct object is still present as the IN. According to Mithun, this type is also found in languages like Tupinambá and Blackfoot.

A significant difference is found in Type III incorporation, where the IN can receive a referential interpretation. It can be definite and specific, it can introduce a referent into discourse, and it can function as the antecedent of

discourse anaphora. (11) is derived from (10) and illustrates a definite IN in Chukchi, from Kozinsky et al. 1988.

- (10) ətləg-e təkəčʔ-ən utkučʔ-ək pela-nen 'The father left the bait at/in the trap.'  
father-ERG bait-ABS trap-LOC leave-3s:3s/AOR
- (11) ətləg-e utkučʔ-ən təkəčʔə-pela-nen 'The father left the bait at/in the trap.'  
father-ERG trap-ABS bait-leave-3s:3s/AOR

Here, the basic function of NI is to manipulate discourse structure; thus Type III is relevant to the whole sentence. NI is used to background a particular referent, making it less salient in discourse. Morphologically, only the order N-V is found here and nothing may intervene between the noun and the verb. This type of incorporation is found in a handful of language families like Nahuatl and Tanoan.

Type IV NI functions as a classifier system; a semantically general noun is incorporated by the verb, which remains transitive, and the IN can be modified by a more specific external NP. (12) shows this for Mohawk (taken from Baker 1995:318):

- (12) Ra-wir-a-núhwe'-s thíkΛ (owirá'a). 'He likes that baby.'  
MsS-baby-Ø-like-HAB that baby

The independent NP in object position may consist of a noun (possibly modified) or a modifier alone. These two cases correspond to doubling (classifying) of the IN's semantic features and stranding of the IN's modifiers, respectively. Type IV NI is also found in Caddoan, Gunwinggu, and other Iroquoian languages.

Mithun's typology is formulated as an implicational hierarchy where a language with productive Type IV NI always has the preceding types, etc. This hierarchy also correlates with the number of languages in each group. Type I incorporation is found in many languages, while Types III and IV exist only in a handful of languages. Significantly, NI with referential INs, stranding and doubling (properties of Types III and IV NI) is found in less than ten language families, all of them polysynthetic languages. How is this correlation to be explained?

*Triggers for NI.* Given the cross-linguistic scarcity of Types III and IV NI, the properties of referential INs, stranding and doubling appear to belong to a marked construction in Universal Grammar, and it is natural to wonder what triggers this type of NI. According to Mithun 1984, the primary function of NI is the manipulation of discourse structure. NI is

used to express a conventionalized activity or background a given referent, allowing another argument to be promoted. An IN can never encode contrastively focused information because it becomes part of the verb, both morphologically and prosodically, in the course of incorporation.

In the polysynthetic languages however, there doesn't seem to be a substantial semantic difference between the analytic and synthetic variants. Thus, there may be syntactic or morphological explanations which apply in these cases. A possible trigger for NI is that either the noun or the verb is morphologically defective and cannot appear as an independent word. This is the case in West Greenlandic Eskimo; certain verbs, so called 'post-bases', are simply subcategorized to attach to a noun (Sadock 1985:399) and NI is obligatory with these forms. Similarly, polysynthetic languages are frequently observed to have defective determiners; if the noun is not governed by a DP, then it would have to adjoin to the verb (Baker 1995:284-291). If a D° is present, the noun will not be able to adjoin to the verb, skipping the D° and violating the Head Movement Constraint of Travis 1984. Thus, as a marked option, NI can be seen as a Last Resort movement (cf. Chomsky 1993) to save an otherwise ill-formed structure. The defectiveness need not be solely morphological; semantic lightness seems to play a role in some languages. In Hopi, the light verbs 'to have' and 'to cause' exist only as suffixes and therefore must incorporate a lexical root; see p. 32-33 for some discussion of these.

As for broader parametric differences, Baker 1995 exploits the evident correlation between polysynthetic properties and NI of Types III and IV and proposes the Polysynthesis Parameter as a further trigger for NI. Informally, this parameter states that every argument of a head must be related to a morpheme in the word containing that head (Baker 1995:14). This parameter is formalized as the Morphological Visibility Condition (MVC) which states that a phrase X is visible for theta-role assignment from a head Y only if it is coindexed with a morpheme in the word containing Y via (i) an agreement relationship or (ii) a movement relationship (Baker 1995:17). The MVC puts incorporated roots and agreement affixes into the same systematic relation with the verb and is thus satisfied either by agreement morphology or by NI. The languages to which the MVC applies are the polysynthetic languages, a subset of head-marking (in the sense of Nichols 1986), nonconfigurational languages, including Mohawk, Nahuatl, Tanoan, Gunwinjguan, Wichita, Chukchee, and Ainu.

## Properties of Hopi NI

Let us now turn to the NI data in Hopi to see which of the typologically possible properties characterize Hopi NI.

*Types I and II.* Hopi has examples of Type I incorporation, where a general noun is integrated with a verb to express a conventionalized activity as in (13)–(16).

- (13) Nu' pep paa-hangwan-ta. 'I am digging out (developing) a spring there.'  
I there water-dig-REP
- (14) Ya vul haki-y pam amàw-ta? 'Who was it that she chose for a dance partner?'  
Q prt. who-ACC she dance:partner-CAUS
- (15) Ya um hiita ho'-ta? 'What are you carrying (in your load)?'  
Q you what load-DUR
- (16) Nu' i-kanel-vok-mu-y kohàl-qöya. 'I killed my sheep from overexposure.'  
I POSS-sheep-animal-PL-ACC radiant:heat-kill

These examples show that Type I NI can target an argument of any thematic role; (13) shows the incorporation of a theme, (14) a predicative, (15) a locative, and (16) an instrumental. Type II NI is also found in Hopi. The incorporation in (17) allows another argument, the affected patient, or possessor, to be promoted to direct object status.

- (17) Nu' ung ma-qwhi-k-na-ni. 'I'll break your arm.'  
I you-ACC hand/arm-break-k-CAUS-FUT

*Discourse relevance (Type III).* In Hopi, the IN is visible to discourse anaphora. NI can introduce a referent into the discourse as an IN which is visible for syntactic coreference. In addition to the generic reference (14)–(16), the IN can also be interpreted as a specific referent with either indefinite reference as in (18), (5) and (13); or definite reference as in (19)–(21).

- (18) Nu' pakiw-maq-to-ni; noqw itam put enang nöö-nösa-ni.  
I fish-hunt-PREG-FUT, so.that we it with.other.food PL:S-eat-FUT  
'I'm going fishing, so we can eat it (fish) along with the other food.'
- (19) Itam kanel-nina-ya-qw nu' put hokya-y-at ngu'-i-'y-ta.  
We sheep-kill-PL:S-OBV I its leg-ACC-POSS.3.SG grab-NR-POSS-DUR  
'When we butchered the sheep, I was holding its leg (while it was being skinned).'
- (20) Kivàa-pe pùwqe pu' apa-mokyaa-ta-t (put) ki-y aw iikwiw-ta.  
Kiva-in sleep then bedding-put:in:bundle-CAUS-PROX it house-ACC  
to carry.on.back-CAUS  
'After having slept in the kiva, he rolled up his bedding and carried it on his back to his house.'

In (18)–(21), the IN introduces a referent into the discourse and acts as antecedent to a following pronoun (null or overt) in a conjoined clause.

- (21) (pam) ay-vena-t pu' (pam put) aw nakwa-toy-na.  
He rattlej-draw-PROX then (he itj) DAT feathers-CAUS-CAUS  
'After he painted the rattle, he adorned it with feathers.'

Thus, the IN can have the same range of interpretations as an independent NP can have in English; it can be specific or generic and definite or indefinite. These reference possibilities are the same as those found in the Type III languages like Chukchi as opposed to languages like English or Oceanic which only have generic reference of the IN (Baker 1995:330). The examples presented in this section place Hopi firmly in Mithun's Type III languages where the IN is discourse relevant.

*Stranding and doubling (Type IV).* Hopi NI can also have a classifier function and strand modifiers. The clearest examples of stranded modifiers to the IN involve adjectives (22)–(23) and quantifiers (24)–(25); the stranded modifiers in the NP agree with the IN in number and case.

- (22) Pas wuu-wupa-t angap-soma. 'She tied really long husks in bundles.'  
really PL-long-ACC cornhusk:wrapper-tie
- (23) Ang nú-nukngwa-t angap-singy-a-t pu' put sòm-ta.  
After PL-good-ACC cornhusk:wrapper-peel-CAUS-PROX then it tie-DISTR  
'After taking off the best husks, she then tied them in several bundles.'

The fact that the adjectives in (22)–(23) agree with the IN for case and number is interesting since in a full NP they would often be adjoined to the noun without any separate case or number marking (see (42)–(43)). Quantifiers can also be stranded; if they are numerals, they will be inflected for agreement with the IN as in (24).

- (24) Nu' lööq-mu-y ho'ap-ta. 'I made two burden baskets.'  
I two-PL-ACC burden:basket-CAUS
- (25) Mö'wi-t engem na'yat ep a'ni kanèl-qö-qya.  
Bride-ACC work party at a.lot sheep-PL:S-kill(PL:O)  
'At the bride's wedding work party they butchered a lot of sheep.'

Although the quantifier *a'ni* 'a lot' in (25) does not agree with the IN, the verb agrees with the plural object. Thus the quantifier takes narrow scope over the object and is not a floating quantifier taking scope over the whole event; this sentence does not imply that there were many different events of sheep-killing, but one event where many sheep were killed.

The IN can also be doubled by an external NP in object position. In (26) and (27), the external noun is more specific than the IN.

- (26) Piikuyi-t paa-mòy-ta. 'He took a mouthful of milk to hold in his mouth.'  
milk-ACC water-have:in:mouth-CAUS
- (27) Nu' qaa'ò-t himu-'y-va. 'I took possession of the dried ears of corn.'  
I corn-ACC thing-POSS-INGR
- (28) Nu' pay susep haqam waynume' haki-mu-y haki-hep-t-inum-ngwu.  
I just always where walk.about someone-PL-ACC who-look:for-t-  
CIRCG-HAB  
'Always when I'm about somewhere, I would go around looking for  
certain people.'

In (28), the IN is a *wh*-word which is literally repeated in the external NP. It may be significant that *haki* 'who' can also have an indefinite reading, meaning 'someone', with negation 'anyone'. The incorporation of a semantically light noun together with literal doubling by an independent noun phrase constitutes a clear classifier function of NI. Thus, the existence of stranding and doubling identify Hopi as a Type IV NI language.

One last point should be illustrated about Type IV NI in Hopi. The verb in (30)–(32) agrees with an incorporated noun, which seems to be an overt marking of transitivity.

- (29) Nu' pahon-t niina. 'I killed a beaver'  
I beaver-ACC kill (SG:S.SG:O)
- (30) Höq-na'ya-t engem lööq-mu-y kanel-nina-ya.  
harvest-work:bee-ACC party two-PL-ACC sheep-kill(SG:O)-PL:S  
'They butchered two sheep for the harvesting party.'
- (31) Nu' pu' totokmi naalöq kanèl-qöya.  
I this dance.day four sheep-kill(SG:S.PL:O)  
'This year I butchered four sheep for the dance day.'
- (32) Mö'wi-t engem na'yat ep a'ni kanèl-qö-gya.»  
Bride-ACC work party at a lot sheep-PL:S-kill(PL:O)  
'At the bride's wedding work party they butchered a lot of sheep.'

*N-INFL*. Before turning to the possible analyses of the NI data, let us briefly consider another phenomenon in Hopi which looks like NI but has different features and should be kept separate. Nouns, like the other word categories, can bear verbal inflectional suffixes when functioning as the predicate of a verbless sentence (see 41 for P-INFL). The semantics of these suffixes are typically light, including 'have', 'cause', and the aspectual

markers DURative, CONTinuous, PROGressive, POSTGressive, CIRCum-gressive, INGRessive. Consider (33)–(35).

- (33) Ya um siwit ööqayat angqw ho'ap-lawu?  
Q you out of the stems of siwi plants burden:basket-CONT  
Are you making a burden basket out of the stems of the *siwi* plants?'
- (34) Nu' lööq-mu-y ho'ap-ta. 'I made two burden baskets.'  
I two-PL-ACC burden:basket-CAUS
- (35) qötsa-tavo-t pòoko-'y-ta 'He has a white rabbit for a pet'  
white-cottontail-ACC pet-POSS-DUR

This very productive process displays some of the same properties as NI into full, lexical verbs. For instance, the inflected noun in (34) has a stranded modifier, and (35) looks like classifier NI, but is probably predicative. Consider however (36).

- (36) a. siwatwa-'y-ta-ni b. siwatwa-mu-'y-ta  
boyfriend-POSS-DUR-FUT boyfriend-PL-POSS-DUR  
'will have as boyfriend' 'have boyfriends'

In (36b), the IN is itself inflected for number, and the inflection unexpectedly intervenes between the noun and the aspectual suffix. In none of the NI examples discussed in the literature (cf. Mithun, Baker, Rosen, and references cited there) does inflectional morphology intervene between the IN and its incorporating verb. I thus conclude that these inflected nouns are not NI as it occurs with lexical verbs. Rather, (33)–(36) are verbless sentences where the noun bears the aspectual inflection usually associated with the verb. This implies that all word categories can have an extended projection with the functional structure of a clause (Hale & Jeanne, LI class, 1995).<sup>1</sup>

### The syntactic approach to NI

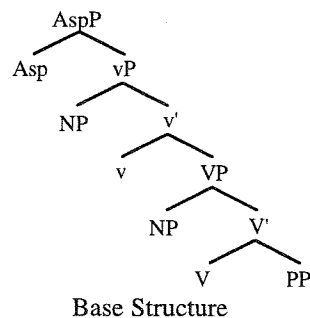
The syntactic approach to NI is due primarily to the work of Baker 1988, 1995 and Sadock 1985 who have argued that NI with the properties of a referential IN, stranding and doubling is best analyzed with syntactic

<sup>1</sup>There are some interesting distributional facts about these suffixes which might indicate the structure of the clause above the lexical domain. The light verbal suffixes 'have' and 'cause' must be adjoined to a lexical root and can be generated in the light vP of a VP-shell (cf. Larson 1988; Chomsky 1995). POSS is not sufficient to form a verb on its own; it must be followed by an aspectual suffix but never by CAUS. The aspectual suffixes are higher in the structure as they occur further out from the root. Thus CAUS and POSS seem to be in complementary distribution, in the same structural position. This is not the entire story though. While POSS must be followed by an aspectual marker, CAUS may not be, presumably due to its inherent perfective meaning. CAUS may however be followed by another CAUS, giving a benefactive reading 'cause to have, provide with' and blocking POSS-CAUS. Thus more than one light vP shell is necessary to derive an example like (42) with CAUS-CAUS.

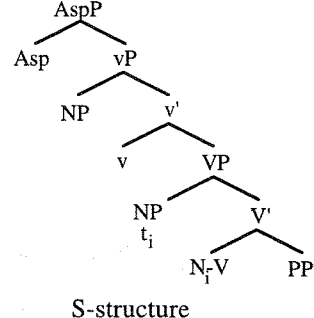
principles. This account takes a weak view of the lexicalist hypothesis, assuming that some morphology may occur in the syntax, if properly motivated. However, a syntactic analysis is not proposed to cover all N-V compounding, such as the few examples in English. Mithun's Types I and II NI are regarded as lexical compounding as they are lexicalized units in the discourse and behave like anaphoric islands. That is, reference cannot be made to the nominal stem in these compounds. For example, English has a N-V compound in *we went berry-picking*. But as the noun is not referential, *we berry-picked those big ones* is not possible. Lexical compounding of the English type is found in widely varying languages, while syntactic NI only occurs in polysynthetic languages.

*Analysis.* I here outline the basic analysis as proposed by Baker 1995. In NI, the direct object undergoes head movement and adjoins to the verb. (37a) shows the basic tree for an underlying, preincorporation structure and (37b) the result of the adjunction in surface structure.

(37) a.



b.



Syntactic incorporation can only occur from theme (direct object) position; the  $N^\circ$  lowers to the base position of the lexical  $V^\circ$ , and its trace is antecedent-governed under m-command. Movement of the noun up to the light verb  $v^\circ$  is ruled out because this is a longer movement than lowering within VP to  $V^\circ$ . Incorporation of a Goal (indirect object) is ruled out as goals are underlyingly PPs, and movement of the  $N^\circ$  across the intervening  $P^\circ$  would violate the Head Movement Constraint of Travis 1984. As for incorporation of an agent, there are two options. The  $N^\circ$  in subject position could lower to  $v^\circ$ , a derived position of the verb in a Larsonian VP-shell; however, this process would require the successive-cyclic movement of the verb to the IP domain to be interrupted in order for NI to occur, violating

the conception of chain formation in Chomsky 1993. Alternatively,  $N^\circ$  could raise and incorporate into  $Asp^\circ$  or whatever functional projection selects VP, but this longer movement through both NP and VP is again ruled out by the existence of the more economical derivation just mentioned. Thus the syntactic account explains in a principled way why syntactic NI only targets direct objects and not subjects and goals. This description has necessarily been brief due to space, but see Baker 1995, Ch. 7 for a detailed discussion.

The crucial properties distinguished by Baker for syntactic NI are summarized in (38).

- (38)
- N-V order
  - NI applies to direct objects
  - IN is discourse referential
  - rich agreement
  - (stranding and doubling)

Based on the examples presented in the previous section, NI in Hopi fulfills the requirements for a syntactic analysis. Morphologically, Hopi shows the standard properties of syntactic NI: (i) the IN is stripped of its inflectional morphology, and (ii) the noun directly precedes the verb with no intervening inflection. This relative ordering between the incorporated noun and the verb supports the theory of leftward adjunction as argued for in Kayne 1994, and it extends to the surface order of many verbal inflections in Hopi, one counterexample being reduplication as in (32).

Hopi displays the same subject-object asymmetry as other NI languages. Lexical compounding in Hopi may target arguments with thematic roles other than theme (see (14)–(16)), but syntactic NI applies only to direct objects. The existence of these lexical compounds does not reduce the syntactic properties of the other NIs. Baker 1995 assumes that lexical and syntactic NI can coexist in UG and even within the same language, but the syntactic analysis is seen to be the unmarked option in polysynthetic languages where it is triggered by the MVC.

The referentiality of the IN is easily accounted for in the syntactic analysis. The noun is base-generated as a separate syntactic entity; head movement of  $N^\circ$  leaves a trace which is active in the syntax, is able to introduce a referent into discourse, be the antecedent to pronouns, and assume a definite or indefinite interpretation. Stranding of the IN's modifiers is also explained elegantly in a syntactic analysis. The head moves

out of the NP into V, and its modifiers are left stranded in an agreement relation with its trace.

The syntactic approach has more difficulty explaining Classifier NI, where a direct object occurs concurrently with an IN. The explanation advanced by Baker for Mohawk and the other polysynthetic languages is that the doubled object is actually a nominal adjunct outside of the clause (VP) which has doubled the IN's features from the trace in N. This may be a reasonable proposal for Mohawk, but seems unmotivated for Hopi. Considering doubled objects to be adjuncts explains the non-configurationality found in the polysynthetic languages, but seems like a wild claim for Hopi given the language's configurational word order. However, Hopi makes wide use of the topicalization structure in (39) with a clause-internal resumptive pronoun referring pleonastically to the topicalized constituent.

- (39) mi' maana, nu' pu-t tuwa. 'That girl, I see her.' (Jeanne 1978:234)  
that girl I her-ACC see

Importantly, the adjoined NP occurs in the unmarked case rather than the accusative which the clause-internal pronoun must bear in object position. Furthermore, this pleonastic expansion may occur with a phrase of any category. This structure is surprisingly similar to the adjoined NPs which Baker assumes for the polysynthetic languages, and in which feature mismatches are similarly allowed (Baker 1995:121-32).

The main difference between Hopi and the other syntactic NI languages is the richness of agreement inflection on the verb, and even this is of minor importance. As we have seen in (30)–(32), Hopi verbs agree with both their subject and object, and even bona fida polysynthetic languages like Mohawk employ a zero marking for object agreement in certain cases.

### The lexicalist approach to NI

There are conceptual arguments against the syntactic approach to NI outlined above, and a long tradition of linguists propose to respect the morphological integrity of the word. This view is formulated in the Strong Lexicalist Hypothesis which requires that all word formation, and consequently NI, occur presyntactically in the lexicon. This hypothesis draws on the intuition that the word has the same psychological status in all languages regardless of its internal complexity. The word in a polysynthetic language may simply contain more information than that in an isolating language like English. When Mithun 1984 states that "noun incorporation is

the most nearly syntactic of all morphological processes" she draws on a long tradition of lexicalists. Most notably, Sapir 1911 argued against Kroeber 1909 that the morphological process of NI should be kept separate from syntactic processes.

*Analysis.* The lexicalist approach to NI has been argued for primarily by Rosen 1989. She points out that lexical N-V compounding follows the same thematic hierarchy as syntactic NI. English has compounds with an incorporated theme as in *man-eating by sharks* but not an incorporated agent as in *\*shark-eating of men*. It is thus unnecessary to invoke the syntax to explain why only direct objects are incorporated; the thematic hierarchy of INs must follow from independent considerations. She proposes that NI is essentially lexical compounding which applies to the predicate argument structure of a verb; the different syntactic behavior of NI cross-linguistically is attributed to different derivational processes. Rosen divides NI into two word formation processes which occur presyntactically in the lexicon: Compound NI and Classifier NI. The first corresponds to Mithun's Types I-III and the latter to Type IV. This distinction is based on the clustering of three syntactic properties found in Classifier NI but not Compound NI: transitivity of the N-V, stranding, and doubling.

In Compound NI, the object is incorporated into the verb and the verb's internal theta-role is saturated by the IN. The resulting N-V compounds are intransitive verbs which do not allow stranding or doubling. In Classifier NI, the object is incorporated, but the verb's internal theta-role is not saturated by the IN; rather, it percolates up to be assigned to a direct object. This derives the important difference that Classifier NI results in a transitive verb. Thus doubling of the IN is easily predicted. The same argument structure accounts for stranding, with the difference that the complement is filled by a null object *pro* instead of an overt nominal. The null head *pro* has phi-features, is referential, and can be modified. The transitivity of Classifier NI is crucial as it accounts for both stranding and doubling in a uniform way. Thus Rosen's analysis is theoretically simple and seems to explain the varying properties of NI cross-linguistically; languages simply choose between two derivations.

However, on closer examination there are problems with a lexical analysis. In general, this theory offers no explanation of why NI with stranding and doubling (and a referential IN) occurs only in polysynthetic languages. The choice between Classifier NI and Compound NI is not

related to the other properties of a language in general, and the lexical account misses an important generalization about what type of languages allow syntactic NI.

Furthermore, although the derivational processes are simple, they are not sophisticated enough to fully derive all the details of either NI type. First, the claim that Classifier NI always results in a transitive verb is too strong. Any example with stranding (e.g. (22)–(25)) must include a transitive verb and *pro* as the object. For Hopi, it has already been noted that arguments are not freely dropped and there are severe restrictions on when *pro* is licensed. It is thus unjustified to say that all NI in Hopi is Classifier NI with rampant *pro*-drop of the assumed direct object. Furthermore, Classifier NI produces a structure which allows both stranding and doubling; thus any language with one of these properties should have the other. Southern Tiwa presents a counterexample in that modifiers may freely be stranded but an IN may not be doubled by an overt nominal head (Allen et al. 1984; Baker 1995:313). The lexical approach has no way to account for this, while the syntactic approach attributes this to independent factors. Moreover, any verb derived by Classifier NI is transitive and should show agreement morphology with the null object *pro*. The prediction is borne out in Hopi as the resulting N–V agrees in number with the object; see (30)–(32). However, as noted by Baker, the theory breaks down on Southern Tiwa and Mohawk where Classifier NI and object agreement do not imply one another; Tiwa has object agreement with an IN but no doubling and Mohawk has doubling but no agreement with the IN (Baker 1995:319). The syntactic approach makes no such predictions; syntactic NI need not result in a transitive verb, and whether or not the verb agrees with an IN depends on other factors.

A second problem with Rosen's account is that it fails to distinguish the referential properties of the IN in Type III NI from the anaphoric island compounds found in Type I. In Chukchi, doubling and stranding are not allowed so that Compound NI is the relevant process (see Spencer 1995). The IN in Chukchi should obey the Anaphoric Island Constraint as in English, but it does not (e.g. 11). The referentiality of the IN in Compound NI cannot be explained without the object *pro* present in Classifier NI.

Rosen's analysis of Classifier NI also has the potential to overgenerate in the domain of questions. As the verb is still transitive, *wh*-elements could be generated in argument position and could cooccur with an IN bearing the same theta-role. The syntactic theory predicts this to be impossible as both

the *wh*-word and the IN would have to originate in the same structural position. Baker presents evidence from Mohawk where the sentence *Who did he-baby-slap?* meaning 'who, a baby, did he slap?' is ungrammatical because the *wh*-phrase *who* must originate in the same position as *baby*. The question is made grammatical by replacing *who* by a modifier *which* (not originating in argument position) as in *Which did he-baby-slap?* 'which baby did he slap?' (Baker 1995:322-6). This seems to hold for the similar Hopi example in (40).

- (40) Um hiita paa-moy-ma? 'What kind of liquid is in your mouth?'  
you what water-have:in:mouth-PROG

The *wh*-phrase modifies the IN, which is a classifier, but does not directly double its thematic role. The translation is indicative; (40) is not taken to mean 'what x, x = water, is in your mouth?'. However, a better understanding of the status of *wh*-words in Hopi would be crucial to argue that this example is definitive.

Although Rosen's analysis provides an attractive and simple approach to N–V compounding with broad cross-linguistic coverage, it leaves unexplained a number of problems which are addressed in the syntactic approach. The lexicalist account fails to capture the referential properties of Type III NI and the analysis of Classifier NI is too programmatic.

### Other types of incorporation

It may be significant that not only nouns are incorporated in Hopi. Thus an important parameter to consider is not just NI cross-linguistically, but the incorporation of other word categories within the same language. In Hopi, postpositions can incorporate their complements (41) and nouns incorporate adjectival modifiers (42).<sup>2</sup>

- (41) N–P–V (Jeanne 1978:140)  
a. Mano paasa-t 'a-w-ni                      b. Mano pas-mi-ni  
Mano field-ACC 3:SG-to-FUT                      Mano field-to-FUT  
'Mano will go to the field.'                      'Mano will go to the field.'
- (42) A–N–V–V  
Nu' put puhu-hovinavàn-to-yna. 'I provided him with new pants.'  
I him new-pants-CAUS-CAUS.

The MVC and the syntactic analysis of NI applies straightforwardly to postpositions in Hopi. Even if the MVC applies to some extent to Hopi, it

<sup>2</sup>The status of adjectives as a separate word category in Hopi is uncertain (Jeanne 1978:316).



does not account for the adjective incorporation (AI) in (42) which seems to present a real problem for the syntactic analysis. This point has been argued by Spencer 1995 on the basis of similar data from Chukchi. Assuming that adjectives are generated as adjuncts to their head nouns, AI would imply lowering the adjective to the noun, a movement which would violate the Empty Category Principle as the moved element would not c-command its trace. Spencer concludes that all incorporation must be a lexical operation on predicate-argument structure.

AI is significant as it is even more common than NI in Hopi (LaVerne Jeanne, personal communication). Moreover, the incorporated adjective (IA) in (43) displays properties similar to NI with stranding.

- (43) Nu' pas loma-mantuwa-'y-ta.      'I have a very pretty girlfriend.'  
I really pretty-girlfriend-POSS-DUR

In (43), the adverb does not modify the entire verbal event, meaning *I really have a pretty girlfriend*, rather it takes narrow scope over the adjective. The IA has stranded its adverbial modifier in AdjP; thus the IA is syntactically active in a fashion parallel to the NI examples with stranded modifiers. However, this phenomenon need not be so fatal for the syntactic analysis as Spencer argues. If the AdjP is generated in the specifier position of the lexical NP, it could lower to the base position of the noun under the same structural requirement of m-command as was assumed for NI. Alternatively, the Adj could be the predicate of a small clause and incorporate from there.

A further example of the syntactic activity of the IN is provided by the incorporated *wh*-words in (44) which still retain their interrogative force.

- (44) a. Pam himu-lavayi?                      b. Pam himu-mana?  
      that what-language                      that / she what-maiden  
      'What language is that?'                'Of what nationality is she?'

### Is Hopi polysynthetic?

To summarize, Hopi shows all the characteristics of Types I–IV NI and thus qualifies as a syntactic process in Baker's terms. Syntactic NI is the starting point for Baker's 1995 comparison of the polysynthetic languages, and although it is a necessary component, it is not the primitive for polysynthesis. The driving force behind polysynthetic grammars is the MVC of which NI is just one realization. The languages which have syntactic NI and which Baker considers as polysynthetic are Mohawk, Wichita, Southern Tiwa, Nahuatl, Gunwinjguan, Chukchi, and Ainu.

Therefore, the facts presented in this paper seem to challenge Baker's definition of polysynthesis: Hopi has syntactic NI but does not obviously display the properties of a full-fledged polysynthetic language.

Let us very briefly review the evidence for and against Hopi being considered polysynthetic. Baker 1995 gives a crude typological characterization of these languages as head-marking in Nichols' 1986 sense and non-configurational. Hopi seems to have a mixed system; it is head-marking and at the same time configurational with strong head-final order. According to a traditional definition of polysynthesis in morphological typology, Hopi does not really qualify as polysynthetic. It lacks the hallmark of polysynthetic languages – a functionally complete sentence consisting only of a verb which has agreement affixes indicating all participants. Nor does Hopi overtly display the properties typical of non-configurational languages as described in Hale 1983 – free word order, free dropping of arguments, and discontinuous expressions. Word order is strongly head-final and this is seen consistently in lexical as well as functional categories. Null arguments are allowed in the third person, but there are strong pragmatic limitations on argument dropping, and many examples are preferred with overt pronouns (LaVerne Jeanne, personal communication). At present, I have no data on the (non)existence of discontinuous expressions, so I will make the safer assumption that they aren't found in Hopi. However, these configurational properties do not prove that Hopi is not polysynthetic as none is without exception. Some scrambling for discourse reasons is allowed, and null arguments are not disallowed. Furthermore, the topicalization structure discussed for (39) shows a striking resemblance to the clause structure Baker proposes for the polysynthetic languages, in which NPs are always adjoined, and the clause-internal argument positions filled by *pro*. The difference in Hopi seems to be that the clause-internal arguments are not *pro* but overt pronouns.

The second major feature of polysynthetic languages was head-marking morphology. Although not a sufficient criterion to classify Hopi as polysynthetic, the strong head-marking tendency is consistently observed in all phrase categories in Hopi. Nouns agree with their possessors (19), and postpositions either agree with their complements in number and person or incorporate them (41). Hopi verbs always agree with the number of both the subject and the object; thus the verb 'to kill' has the four-way agreement paradigm shown in (45).

(45)

	SG:O	PL:O
SG:S	niina	qōya
PL:S	nina-ya	qō-qya

Verbal agreement in Hopi is impoverished with respect to the polysynthetic languages in that it only marks number and not person or gender.

These considerations certainly do not have the effect of making the MVC apply to Hopi. Rather, they seem to identify Hopi with languages like Inuktitut, Northern Athapaskan, and Quechua which are "hybrids of head-marking and head-final languages; they have both verb-final and nonconfigurational tendencies" (Baker 1995:506). The parallels stop here though as these 'hybrids' differ systematically from the polysynthetic languages in lacking syntactic NI, a property which Hopi exhibits. The similarities between Hopi and the polysynthetic languages become more striking when comparing the specific polysynthetic structures that Baker correlates with syntactic NI. Consider (46).

(46)

	Hopi	Comment
• syntactic NI	yes	
• obligatory object agreement	yes	(30-32)
• free argument dropping	restricted	<i>pro</i> in third person (Jeanne 1978)
• free word order	SOV	some scrambling/topicalization
• no NP reflexive	yes	reflexive prefix (Jeanne 1978:149)
• no nonreferential quantifiers	probable	wh-word as indefinite, polarity item
• obligatory <i>wh</i> -movement	optional	(Jeanne 1978:178)
• N agrees with R argument	?	
• no true determiners	yes	no articles (Kalectaca 1978:28-30)
• N agrees with possessor	yes	(Jeanne 1978)
• restricted morphocausative	yes	(Hale & Jeanne: LI class, 1995)
• NI or Agr in PP	yes	(41, from Jeanne 1978:140)
• CP arguments only if nominal	yes	(Jeanne 1978:184)
• no infinitive	yes	

Judging from the list in (46), Hopi shares a surprisingly large number of properties with the prototypical polysynthetic languages. The three points of difference, argument dropping, word order, and *wh*-movement, are not without conspicuous exception. However, these points may rank more heavily than others in the Polysynthesis Parameter. One fact of Hopi which does not emerge from the comparison and which runs counter to the MVC is that some Hopi verbs (e.g. 'look at') take postpositional objects (Jeanne 1978:159).

This outline of the possibly polysynthetic properties of Hopi is meant to be suggestive and does not present the results of detailed research. I am interested here in the relation between NI and the other properties of Hopi

as they may explain why NI works the way it does. The sketchy overview presented above seems to validate the idea that the MVC might apply in Hopi after all, but that its effects are obscured by some other parameter (e.g. head-final) which is also in force. An intriguing area for further research is how more than one macroparameter can be compounded in a language, resulting in hybrid systems.

## Conclusions

This paper has presented evidence that Hopi has Type IV NI with the properties of syntactic NI – a referentially active IN, stranded modifiers and doubling. Of the two analyses considered, the syntactic account offers the more complete explanation. Although the lexical approach is theoretically simpler and more flexible (it extends easily to adjunct incorporation), it makes false predictions concerning the referentiality of the IN and the transitivity of Classifier NI. Nor does the lexical account offer any explanation of why these properties of NI occur in precisely the polysynthetic languages. Baker 1995 addresses this issue in detail and presents a uniform analysis of syntactic NI and the other properties of polysynthetic languages. If NI in Hopi is truly syntactic, as I have argued, this presents a paradox for the Polysynthesis Parameter. Hopi displays a number of polysynthetic structures but lacks certain key features such as free word order and free *pro*-drop. Rather than explain away these polysynthetic properties, I suggest that the Polysynthesis Parameter does apply in Hopi, but that its effects are partially obscured due to some other macro- or microparameter applying at a more superficial level.

## References

- Allen, B., D. Gardiner & D. Frantz. 1984. 'Noun incorporation in Southern Tiwa'. *International Journal of American Linguistics* 50, 292-311.
- Baker, M. 1988. *Incorporation: a theory of grammatical function changing*. Chicago: University of Chicago Press.
- Baker, M. 1995. *The polysynthesis parameter*. New York: Oxford University Press.
- Bricker, V. 1978. 'Antipassive constructions in Yucatec Maya'. In *Papers in Mayan linguistics*, 3-24. Columbia: University of Missouri.
- Chomsky, N. 1993. 'A minimalist program for linguistic theory'. In *The View from Building 20*, 1-52. Cambridge: MIT Press.
- Chomsky, N. 1995. *The minimalist program*. Cambridge, MA: MIT Press.

- Hale, K. 1983. 'Walpiri and the grammar of non-configurational languages'. *Natural Language and Linguistic Theory* 1, 5-47.
- Harrison, S. 1976. *Mikolese reference grammar*. Honolulu: University Press of Hawaii.
- Hill, K. C. et al. in press. *The Hopi dictionary: Hopi - English dictionary of the Third Mesa dialect*. Tucson: University of Arizona Press.
- Jeanne, L. 1978. *Aspects of Hopi grammar*. Doctoral dissertation, MIT.
- Kayne, R. S. 1994. *The antisymmetry of syntax*. Cambridge, MA: MIT Press.
- Kalectaca, M. 1978. *Lessons in Hopi*. Tucson: University of Arizona Press.
- Kozinsky, I. S., V. P. Nedjalkov et al. 1988. 'Antipassive in Chukchi: oblique object, object incorporation, zero object'. In *Passive and voice*, 651-705. Amsterdam: John Benjamins.
- Kroeber, A. L. 1909. 'Noun incorporation in American languages'. *XVI Internationaler Amerikanisten-Kongress*, 569-576. Vienna: Hartleben.
- Larson, R. K. 1988. 'On the double object construction'. *Linguistic Inquiry* 19, 335-91.
- Mithun, M. 1984. 'The evolution of noun incorporation'. *Language* 60, 847-93.
- Nichols, J. 1986. 'Head-marking and dependent-marking grammar'. *Language* 62, 56-119.
- Rosen, S. 1989. 'Two types of noun incorporation: A Lexical analysis'. *Language* 65, 294-317.
- Sadock, J. 1985. 'Autolexical syntax: a proposal for the treatment of noun incorporation and similar phenomena'. *Natural Language and Linguistic Theory* 3, 379-440.
- Sapir, E. 1911. 'The problem of noun incorporation in American languages'. *American Anthropologist* 13, 250-82.
- Spencer, A. 1995. 'Incorporation in Chukchi'. *Language* 71, 439-89.
- Travis, L. 1984. *Parameters and effects of word order variation*. Doctoral dissertation, MIT.

## A cognitive approach to reference

Lars-Åke Henningsson

### Introduction

When we talk about something, we need to indicate what we talk about. Sometimes we can use pointing gestures but mainly we have to rely on words. A pointing gesture can direct attention in perceived space, but how do we direct attention with words? What can we do with speech sounds we hear, to find out what somebody wants to tell us about something and what that something is?

Questions about reference could be posed in different ways. To formulate such questions in the way done above, as questions about how reference relations are established when we use language for communicative purposes, is to pose them within a cognitive perspective. The reference problem conceived cognitively concerns how cognitive processes in which reference relations are established should be characterised.

### Uses of language

Language is used for identification of referents not only in communication but also in reasoning. If it is an ambition in communication to avoid ambiguities that can lead to misunderstanding, it is still more so in logical reasoning. In order to make a reasoning as consistent as possible, it is useful to state its premises clearly from the outset, which includes identification of referents and unambiguous names for them. Having established a *knowledge base* in this way, it is then possible to try to draw conclusions from it, referring to the referents identified via their names and to the postulated premises.

These two ways to refer to something, the *introducing* way, when a new reference relation is established, and the *predefined* way, to refer via a given knowledge base, are clearly separated in formal logic as two phases, but they are not separated as distinct phases in communication. When we need to identify and introduce new referents, we do so as freely as we refer to something in a common knowledge base. Furthermore, when we refer to