

NOUN INCORPORATION, RELATIVE CLAUSES AND THEIR INTERACTIONS IN POLYSYNTHETIC LANGUAGES¹

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0. Introduction

In numerous recent studies it has been pointed out that the interface between morphology and syntax is extremely complex, much more than it may seem at first sight. Drawing a sharp dividing line between the two, however, is at least a very difficult task, if not an impossible one. In this paper, we will consider two examples of interface phenomena: the first one, Noun Incorporation (NI), is generally described as an “exotic” construction, to be found only in certain polysynthetic languages from the Americas, Asia and Australia; in descriptive literature, there is a general consensus that morphology is involved in the process, but the role syntax plays in it is very debated among different theoretical approaches.

NI is essentially a morphological compounding process combining a nominal and a verbal root, thereby yielding a complex verbal stem. Defining it is itself problematic, as we shall see.

Relative Clause (RC) formation is instead a universal phenomenon, but has been mostly described in the field of Indo-European languages, putting greater emphasis on syntactic than on morphological factors. Here, we will limit ourselves to restrictive RCs, defining RRCs as modifiers of a nominal head with the function of determining the restriction of the determiner, following Bianchi (2002).

Our aim in this paper is essentially to describe the complexity of the interactions that these two morphological phenomena may assume in a cross-linguistic perspective, paying special attention to *polysynthetic* languages. In order to avoid terminological confusion, however, it will be necessary to specify in what sense we use the term ‘polysynthesis’, even if

¹ This descriptive working paper is articulated as follows: the introduction and section 1 are exclusively Muro’s work. Our joint work begins from section 2, which is mainly due to Modena. Section 3 is mainly the fruit of Muro’s observations about patterns found in polysynthetic languages of various families. The conclusions are the most properly joint work. For helpful suggestions, special thanks are due to Paola Benincà and Alberto Mioni, as well as to our Korean consultant, Park Jin-Kyung. Many imperfections still remain, and for those we take full responsibility.

this phenomenon is not the main focus of our paper. A brief survey of the problems in defining polysynthesis will be provided in section 1.2.

In section 1, we will explore in some detail the interface properties of NI constructions, and in section 2 those of RCs. After recognizing the main morphological processes active in each of the two constructions, we will show that what they have in common is the fact that both involve an NP (and in some cases also higher projections within the DP), which modifies a verb in the case of NI, and takes on the role of a modified head in the case of (headed) RCs. This said, it is natural to suppose that this convergence should give rise to interactions between the two constructions: in section 3, we examine the ways they interact. Theoretical implications are outlined in the conclusions.

1. What is NI?

Let us start by giving a general definition of incorporation, in order to understand why the incorporation of nouns has acquired such special importance in recent scientific debate. Gerds (1988:84) gives the following definition:

- (1) Incorporation is the compounding of a word (typically a verb or preposition) with another element (typically a noun, pronoun, or adverb). The compound serves the combined syntactic function of both elements.

In other words, according to the author, incorporation is a combination process that involves *lexical categories*, and is therefore different from other affixation processes whereby *functional* morphemes are attached to words. Sticking to the above definition, the theoretical assumptions one starts with about the functional or lexical status of a particular category become very important, as they determine our ability to distinguish between *incorporation* and *affixation*.² Baker (2003), for example, assumes the existence of only three lexical categories (nouns, verbs, and adjectives); Cinque (2007) points out that direct modification adjectives should be considered functional rather than lexical. Adverbs, on the other hand, although often very similar to adjectives formally, are generally considered functional and not lexical (Cinque 1999). We can thus rely on only two and a half (or at best three) lexical categories. On a purely theoretical level, therefore, it is very hard (and theory-specific) to distinguish between incorporation and affixation.

² An important distinction to be made is that between *functional* and *lexical affixation* (cf. below, par. 1.1); for a description of this phenomenon as found in the two Native American language families Salish and Wakashan cf. Muro (2008).

For this reason, we will restrict our inquiry to the combination of verbs with nouns (and noun-like elements such as light nouns and classifiers); as a working hypothesis, we propose the following definition for NI:

- (2) *Noun Incorporation* is every form of morphosyntactic combining of nominal and verbal morphemes (be they stems, roots or lexical affixes), which are morphologically fully integrated so as to form one single stem.

This definition does not require I(ncorporated) N(oun)s to be able to function as independent roots taking their own functional morphology, for this is a property only of stems and some roots (excluding lexical affixes, which have been argued to be a special type of roots³). The above given definition thus allows for suppletion between the incorporated forms and the corresponding free-standing ones, a desirable result, in the light of the data we are going to consider.

Incorporation and affixation usually co-occur, especially in polysynthetic languages (in the sense defined below⁴), and NI, in particular, is almost exclusively found in languages of this type⁵. For this reason, polysynthetic languages will be the main topic of our paper.

1.1. True NI vs. affixal predication

To illustrate the phenomenon of NI, let us consider the following examples from the Iroquoian language Mohawk (Baker 1996:12) and the Chukotko-Kamchatkan language Chukchi (Polinskaja & Nedjalkov 1987:240):⁶

³ Wiltschko (2009) makes precisely this claim about Halkomelem lexical suffixes.

⁴ Cf. Muro (2008: 4) for a survey of various definitions of polysynthesis.

⁵ Indeed, we can turn this statement into an implicational universal, as follows:

- (a) polysynthetic \rightarrow synthetic

meaning that if a language is polysynthetic, it must be a synthetic one first, where synthetic means that it must have a very well-developed functional morphology. The reverse does not hold, as many synthetic languages are not polysynthetic.

⁶ In this paper the following abbreviations have been used: 1=first person; 2=second person; 3=third person; A= agent; ABL= ablative; ABS= absolutive; ACC=accusative; AN = animate; BEN = benefactive; CAUS = causative; COMP = complementizer; DAT=dative; DECL=declarative; DEF=definite mood (Mohawk); DET=determiner; DIM=diminutive; DUP=duplicative (Mohawk); ERG=ergative; EVID=evidential; F=feminine; DISTR=distributive; GEN=genitive; HAB=habitual; IN=inanimate; INCH=

- (3) a. *wa?khnínı̄?* *ne kanáкта?* [MOHAWK]
wa?-k-Ø-hnínı̄-? *ne ka-nákt-a?*
 DEF-1SG.S-3N.SG.O-buy-PUNC NE N.SG.S-bed-NMLZ
 ‘I bought a/the bed.’
- b. *wa?kenaktahnínı̄?*
wa?-ke-Ø-nákt-a-hnínı̄-?
 DEF-1SG.S-3N.SG.O-bed-Ø-buy-PUNC
 ‘I bought a/the bed.’
- (4) a. *ətləge mətqəmət kawkawək* [CHUKCHI]
ətləg-e mətqəmət-Ø kawkaw-ək
 father-ERG butter-ABS bread-LOC
kilinin
kili-nin
 spread.on-3SG.S/3SG.O
 ‘Father spread butter on the bread.’
- b. *ətləgən kawkawək mətqərkeleg?e.*
ətləg-ən kawkaw-ək mətqə-rkele-g?e
 father-ABS bread-LOC butter-spread.on-3SG.S
 ‘Father spread butter on the bread.’

A first difference that leaps to the eye is that, while in Mohawk agreement seems to be insensitive to NI,⁷ the Chukchi example shows that the incorporation of a noun has an effect comparable to that of an antipassive

inchoative; INCL=first person inclusive; IND=indicative; INDF=indefinite; INSTR=instrumental; INTERR = interrogative mood (Nuu-chah-nulth); INTR=intransitive; IPFV=imperfective; L = vowel lengthening root (Nuu-chah-nulth); LOC = locative; M=masculine; N=neuter; NEG=negative; NMLZ=nominalizer; NOM=nominative; O=object; OC=out of control; P=possessor; PL= plural; PRES=present; PST=past; PFV=perfective; POSS=possessive; PUNC=punctual; Q=question marker; QUOT=quotative mood (Nuu-chah-nulth); REL=relative marker; RL=relative mood; S=subject; SG=singular; SREFL=semireflexive (Mohawk); STAT=stative; SUBORD=subordinative mood; TOP=topic. Detailed morpheme-by-morpheme breakdowns of examples are given whenever available.

⁷ Actually, this generalization does not show clearly in this example, but Baker, Aranovich & Golluscio (2004:156) have argued that Mohawk object agreement is actually reduced to its default values (3, N, SG) when a noun is incorporated. This is different that saying that object agreement simply does not take place.

morpheme, i.e. of making the verb intransitive (this also appears from case morphology on the DP arguments in Chukchi, where case alignment operates on an ergative/absolutive basis). This difference forms the basis of Rosen's (1989) distinction between *classificatory* vs. *compounding NI* (the Mohawk type vs. the Chukchi one, respectively).

A special case of incorporation is what we term *affixal predication*⁸ (a process typical of Eskimo-Aleut and Wakashan, although present elsewhere), i.e. a NI process making use of affixal verbs that are etymologically unrelated to their closest lexical equivalents⁹. These affixes have a clear verbal meaning, but cannot function as verbal roots in a clause. As an example, let us consider the following Ahousaht Nuu-chah-nulth sentences (Wojdak 2005:105ff.):

- (5) a. *maakuk^wit?iš* *čakup maḥṭii* [NUU-CHAH-NULTH]
maakuk-mit=?iš *čakup maḥṭii*
buy-PST=3SG.S.IND man **house**
 'A man bought a house.'
- b. **maḥṭa^wmaakuk^wit?iš* *čakup*
maḥṭa-maakuk-mit=?iš *čakup*
house-buy-PST=3SG.S.IND man
 'A man bought a house.'
- c. *?u?aamit?iš* *čakup maḥṭii*
?u-'aap-mit=?iš *čakup maḥṭii*
Ø-buy-PST=3SG.S.IND man **house**
 'A man bought a house.'
- d. *maḥṭa?aamit?iš* *čakup*
maḥṭa-'aap-mit=?iš *čakup*
house-buy-PST=3SG.S.IND man
 'A man bought a house.'

⁸ Following Wojdak (2005), who uses the term *affixal predicates* for the class of Wakashan incorporating affixes with verbal meaning.

⁹ See Muro (2008) for a comparative description of suppletion in NI processes, focusing on Wakashan and Salish (where the suppletion involves INs rather than verbs).

As we can note, the incorporation structure is only possible when an affixal predicate is involved. Combining roots is not possible in this type of language, as there can be only one lexical root per word. It is therefore well grounded to distinguish ‘true’ *incorporating languages* (like Mohawk and Chukchi) from *affixal predication languages* (like Nuu-chah-nulth).¹⁰

1.2. NI and polysynthesis

At this point, When polysynthetic languages were first observed by European scholars like Duponceau or Humboldt, the most astonishing feature of these languages was reported to be their ability to build words that would have to be rendered by whole sentences in more familiar languages like English, German, or French. Algonquian and Eskimo languages are two good examples of this language type; let us consider the following word-sentences (6 from Leman CLWS and 7 from Mithun 1999):

- (6) *náohkésáa?oné?seómepéhévetséhéstó?anéhe* [CHEYENNE]
ná-ohke-sáa-oné?seóme-péhéve-tséhést-o?ane-he
 1SG.S-HAB-NEG-truly-well-**common.language-pronounce**-NEG
 ‘I truly do not pronounce Cheyenne well.’
- (7) *ayaqaqucuaryuumiitqapiallruyugnarquq-qaa* [YUP’IK]
ayag-qaqu-cuar-yuumiite-qapiar-llru-yugnarq-u-q=qaa
travel-now.and.then-little-want.not-very-PST-probably-IND-3SG.S=Q
 ‘I guess she probably didn’t really want to go for those short little trips, did she?’

What we can readily observe is that these two word-sentences are similar in their extreme degree of synthesis, but different in their contents. In the Cheyenne example, we can observe the following facts about the affixation process:

¹⁰ There are other facts about polysynthetic morphology which cannot be considered here for space reasons; cf. Muro (forthcoming) for a typology of this phenomenon. A special problem is concatenativity, i.e. the possibility of deriving the verbal template through recursive affixation of hierarchically ordered functional features. Typical nonconcatenative languages are those of the Athapaskan family, like Navajo (cf. par. 2). In these languages, a complex interplay of phonological and syntactic factors gives rise to intricate verbal templates, whose syntactic derivation has been the topic of much controversy (cf. Rice 2000).

- it starts from a lexical root that occupies the penultimate position in the template;
- it manifests itself mainly as prefixation, although one suffix (actually the second component of a circumfix) is present;
- it involves the combination of a nominal root (*-tséhést-*) and a verbal one (*-o?ane-*), and is therefore an instance of NI.

By contrast, the Yup'ik word displays an affixation process that:

- starts from a lexical root that occupies the first position in the template;
- manifests itself exclusively as suffixation;
- uses exclusively suffixation of functional morphemes, all having scope over one and the same lexical root (*ayag-*), and is therefore not an instance of NI (although the language has a class of affixal predicates); the synthetic structure of this word is developed by means of merely functional affixation.

This is a clear example of the importance of looking inside polysynthesis, and at this point it also becomes important to explain where the phenomenon shows its nature. As observed, the Cheyenne word-sentence given above is a good example of NI, but the Eskimo one is not. From other constructions we know that Eskimo languages are to be categorized as *affixal predication* languages (cf. above), but this sentence does not display the relevant properties (there is no affixal predicate, only recursive functional affixation). Nevertheless, the word has a high degree of synthesis, so it would be an instance of polysynthesis in Sapir's (1921) sense (i.e. a high number of morphemes per word). The feature that distinguishes *synthesis* from *polysynthesis* is therefore NI and not just the morpheme-to-word ratio that a language may show in its morphological derivations. When we try to define polysynthesis, nevertheless, the terms *incorporating* and *polysynthetic* should not be considered synonyms; rather, we should keep the latter term to designate a language characterised by a whole complex of properties, including NI as well as the special agreement properties of these languages, i.e. multiple agreement (which may include features of up to three arguments).

As to the solutions proposed so far, the most popular approach to the problems outlined above is probably Baker's *Polysynthesis Parameter*, which is stated as a Morphological Visibility Condition (Baker 1996:17):¹¹

(8) *The Morphological Visibility Condition (MVC)*

A phrase X is visible for θ -role assignment from a head Y only if it is coindexed with a morpheme in the word containing Y via:

- (a) an agreement relationship, or
- (b) a movement relationship

Yes: Mohawk, Nahuatl, Mayali, ...

No: English, French, Chichewa, ...

Languages satisfying this condition are what he terms polysynthetic languages, all others being non-polysynthetic.¹² The MVC is, in Baker's opinion, the core defining property of a parameter of UG (the Polysynthesis Parameter), for which the author also gives a more informal definition (p. 14):

(9) *The Polysynthesis Parameter (informal)*

Every argument of a head element must be related to a morpheme in the word containing that head.

The main problem with this definition is a typological one: it excludes many languages traditionally (and in our opinion with good reasons) considered polysynthetic. To sidestep the issue, Muro (forthcoming) presents an innovative definition of polysynthesis, which we will follow as a working hypothesis:

(10) A language is *polysynthetic* if its morphology allows either or both of the following operations:

- (a) building predicates by combining lexical morphemes of different categories (*incorporation* or *affixal predication*);
- (b) systematically marking several arguments of the matrix verb by means of affixal agreement morphology (*multiple agreement*).

¹¹ Kayne (2005:7) explicitly excludes this kind of parameters from UG, starting from the assumption that parametric variation has a lexical nature and not a morphological one.

¹² As observed earlier, this definition yields a much more restricted class of languages.

If a language meets any or both of these requirements, we will consider it a polysynthetic language. Let us examine the implications of this definition for a number of languages.

- Turkish and Hungarian both have a high degree of synthesis, display verb incorporation and a kind of juxtaposition of nonspecific arguments that resembles NI; nevertheless, our definition (along the lines of Baker (1996)) provides that INs in a polysynthetic language be fully integrated with the verb morphologically, and in this sense these languages may not be termed polysynthetic. Hungarian, however, may have multiple agreement, although it remains to be clarified whether this is systematic, since it is morphologically overt in only one combination (1S/2O);
- The Wakashan languages, on the other hand, incorporate in their verbal forms virtually every part of speech, but their extensive use of sentence-second (S2) clitics does not result in true multiple agreement predicates. They are polysynthetic by virtue of the property under (a). Similar considerations apply to Haida, which only has classifier incorporation and expresses agreement by way of clitics.
- A few languages without morphological NI but with multiple agreement are the Northwest Caucasian languages, as well as Navajo and Quechua: these are polysynthetic by virtue of the property under (b).
- Truly incorporating languages (like Mohawk, Chukchi, Sora, Tiwa) are polysynthetic by virtue of both properties.

The conclusions are, as desired, that agglutinating languages with juxtaposition of nonspecific direct objects are not considered polysynthetic just by virtue of their high degree of synthesis, and at the same time, the range of languages falling within our definition is broader than Baker's sample.

1.3. NI: syntax or morphology?

The relationship between syntax and morphology is probably the most debated issue in contemporary linguistic theory. What is at stake is the very existence of morphology as an autonomous component of the grammar. According to Distributed Morphology (DM), for instance, the level of Morphological Structure (MS) is nothing but "the interface between syntax and phonology" (Halle & Marantz 1993:114). On such assumptions, the

traditional architecture of the grammar (syntax, morphology, phonology) would have no theoretical status, and the components of the grammar would be reduced to *morphosyntax* and *morphophonology*. We cannot go into the details of these theoretical problems, and the available evidence (at least as far as NI is concerned) is not decisive in favor of the stronger or the weaker claim (what Schwarze (2007:1) termed the *negationist* and the *autonomist* positions). Be it an autonomous level or just an interface, we will limit ourselves to pointing out a few clues that can help us understand in what measure syntactic factors are active in NI constructions. In our opinion, we could talk about a *morphologization cline*, going from the most syntactic phenomena to the most morphologically integrated ones. Let us observe a few cases; for more details, cf. Muro (forthcoming).

1.3.1. The morphological integrity cline

A first criterion may be sought in the degree of morphological assimilation (mainly due to internal *sandhi* phenomena) of the elements forming the NI construction (most especially INs); loanwords are expected to be the least sensitive to these processes, and the grammaticalization cline ultimately leads to affixation. The cline may be organized as a hierarchy as follows:

- (11) *The Morphological Integrity Cline*
foreign words > derived words > roots > weakly suppletive roots

Most instances of strong suppletion involve a different derivation, and therefore cannot be taken as a degree of morphological integrity. An example of loan incorporation is given for Huauhtla Nahuatl (Merlan 1976:185):

- (12) a. *kanke eltok kočillo na? ni?neki* [NAHUATL]
where 3SG.S-be knife I 1SG.S-3O-want
amanci
now
'Where is the knife? I need it now.'
- b. *ya? kikočillotete?ki panci*
ya? ki-Ø-kočillo-tete?ki panci
he 3SG.S-3O-knife-cut bread
'He **cut the bread** with **the** knife.'

- (13) a. *ika tla?ke kitete?ki panci*
with what 3SG.S-3O-cut bread
'What did he cut the bread with?'
- b. *ne? pancitete?ki ika kočillo*
ne? Ø-panci-tete?ki ika kočillo
he 3SG.S-bread-cut with knife
'He **cut the bread** with a knife.'

Notice how the Spanish loans *panci* and *kočillo* are incorporated without undergoing any morphological modification (the former even retaining a nominalizing affix); it appears that the INs are syntactically fully legitimated, and then incorporated wholesale into the morphological structure of the predicate.

An incorporated derived word appears in the following Oneida example (Michelson & Doxtator 2002, quoted in Barrie 2006:132):

- (14) *wa?utokwa?tslóhale?* [ONEIDA]
wa?-u-atokw-a-?tsl-ohale-?
DEF-3F.S-take.out.of.water-Ø-NMLZ-wash-PFV
'She washed the spoon.'

In this case, the IN is a deverbal noun. A prototypical case of root incorporation is the following from Southern Tiwa (Allen, Gardiner & Frantz 1984:308):

- (15) a. *seuan-ide ti-mũ-ban* [SOUTHERN TIWA]
man-NMLZ 1SG.S/3AN.O-see-PST
'I saw the/a man.'
- b. *ti-seuan-mũ-ban*
1SG.S/3AN.O-man-see-PST
'I saw the/a man.'

Here, the root loses its class suffix before being incorporated. Finally, the following Sora example (David Stampe, quoted in Baker 1996:32) gives an idea of weak suppletion in NI:

- (16) a. *bɔŋtɛl-ən-ədɔŋ* *jom-t-ɛ-ji* *pɔ* [SORA]
buffalo-NMLZ-ACC **eat-NONPAST-3S-PL** Q
 ‘Will they eat the buffalo?’ or ‘Do they eat buffalo?’
- b. *jom-bɔŋ-t-ɛ-n-ji* *pɔ*
eat-buffalo-NONPAST-3S-INTR-PL Q
 ‘Will they eat the buffalo?’ or ‘Do they eat buffalo?’

As can be seen, not only is the IN deprived of its derivational morphology, but also part of the root is eroded.

What can we learn from these examples? On the formal side of morphosyntax, we have a cline that has to stop short of accounting for strong suppletion, whose origins could be outside of the effects of morphophonological rules; on the functional side, however, the cline continues, and it could be formalized as follows:

- (17) *The Grammaticalization Cline of NI constructions*
 IN > light noun /classifier > valence-changing affix
 V > light verb/affixal predicate > auxiliary > valence-changing affix

Strong suppletion in NI is not unheard of, quite the opposite: Muro (2008) compares the two opposite strategies of suppletion to be found in the geographically adjacent (though probably not related) language families Salish and Wakashan. As seen above, we have chosen to term the Wakashan case affixal predication; the Salish phenomenon of lexical suffixation is exemplified below (Czaykowska-Higgins 1998:165-6):

- (18) a. *təx^wəx^w wa ?a?ásq^wsa?s* [COLUMBIAN]
təx^w-əx^w wa ?a-?ásq^wsa?-s
die-OC **WA** **DIM-son-3SG.F.P**
?ací sm?ámml
?ací s-m?ámm-l
 DET NMLZ-woman-POSS
 ‘The woman’s little son died.’
- b. *təx^wəx^wált ?ací sm?ámm*
təx^w-əx^w=ált ?ací s-m?ámm
die-OC=child DET NMLZ-woman
 ‘The woman’s child died.’

As can be noticed, the lexical suffixes functioning as INs are formally totally different from the free-standing form with equivalent (or nearly equivalent, as Mithun 1997 points out) meaning. This is an example of what we have indicated in the Grammaticalization Cline as *light noun/classifier*.¹³

1.3.2. Juxtaposition and incorporation

Many researchers have reported cases of NI in analytic languages like those of the Austronesian family; others have classified as NI examples from agglutinative languages like Turkish and Korean, where the putative IN stands closer than any other word to the verb (whose root occupies the first morphological slot in the word). Since our main defining strategy is full morphological integration of the IN in the verbal complex (following Baker 1996:19), we will not consider these cases instances of NI; for cases like these, we will talk about *juxtaposition*.¹⁴ Historically, this phenomenon may be a prerequisite for the development of NI (see Mithun 1984:872-7); however, NI (as defined above) is typologically only to be found in polysynthetic languages. This distinction is especially relevant when we talk about the morphology-syntax interface: juxtaposition is a phenomenon that takes place above the word level (i.e. in the syntax); NI takes place below the word level (in the morphology), assuming the definition of grammatical word given by Dixon and Aikhenvald (2002:19), i.e. a conventionalized cluster of grammatical elements that always occur together in a fixed order.

Interesting cases are provided by languages with NI where the IN appears externally with respect to agreement and TMA morphology: this is the case of Alaskan Athapaskan languages (see Axelrod 1990 for a description of NI in Koyukon), and possibly also of Crow (see Graczyk 2007). The Athapaskan case is especially interesting, since the INs appear to be all more or less grammaticalized, some having turned into lexical affixes (pretty much as in Salish); it is possible that these INs were originally juxtaposed nouns which have entered a grammaticalization process without

¹³ Our use of the term ‘light noun’ is to be understood as indicating any common noun with little semantic content. We do not endorse any syntactic implication about the categorial status of these elements, which may be roots as well as fully categorised nouns. Thus, our view does not necessarily contrast with or confirm that expressed in Wiltschko (2009), where the status of precategorial roots is argued for Salish lexical affixes.

¹⁴ On the semantic level, juxtaposition may have the same value of true NI, but since our criterion is a morphological one (regardless of whether morphology is an autonomous level or just an interface), we have chosen to reserve the label of ‘noun incorporation’ only to those constructions where morphology is involved.

moving all the way to incorporate into the verb. Some low adverbs (that now are the so-called ‘disjunct prefixes’ in Athapaskanist literature) would have also entered this grammaticalization process together with the INs, which would have thus taken their place inside of the verbal template, but outside of the fully inflected verbal stem.

One last fact worth mentioning is that in the Canadian Athapaskan language Slave (Rice 1989:659) INs may bear personal agreement with their possessors: this may be considered a true case of XP incorporation, an interesting perspective for syntactic theory.

The relationship between incorporation and juxtaposition is thus worthy of the utmost attention, as it can shed light on the development (and therefore the nature) of NI constructions.

1.3.3. Incorporation of complex nominal elements

Some incorporees are hard to classify as INs, as their structure is too complex. By way of example, let us consider the following Chukchi sentence (Spencer 1991:480):

- (19) *tə-tor-taŋ-pəlwəntə-pojgə-pela-rkən* [CHUKCHI]
1SG.S-**new-good-metal-spear-leave-IPFV**
‘I am leaving a good, new, metal spear.’

In this case, the IN has previously incorporated several adjectival modifiers (which are really incorporated in the noun head, as they do not display their usual functional morphology), the outer ones taking scope over the inner ones; the innermost modifier (*pəlwəntə* ‘metal’) is the dependent element of a nominal compound. From the translation, it appears that the whole incorporee is understood as a specific indefinite, an unusual case for morphological NI; this behavior is more typical of syntactic NI (see Baker 1996: cap. 7). Before incorporation, however, a complex morphological operation must have taken place. This is an interesting case of how morphology and syntax can be intertwined with each other. Similar cases involving adjectivally modified nouns hold in Mohawk (see Mithun 1984:880, fn.3), though with some differences (see Muro forthcoming) as there the adjective functions as a predicate, and not as a modifier (thus making the construction a sort of recursive NI).

There even appear to be cases of multiple NI with causatives, like the following from Southern Tiwa, where both the object of the verb and that of the causative are incorporated (Allen, Gardiner & Frantz 1984:306):

- (20) *ti-seuan-p'akhu-kumwia-?am-ban* [SOUTHERN TIWA]
 1SG.S/3AN.O-**man-bread-sell**-CAUS-PST
wisi te-khaba-?i
 two 1SG.S/3IN.O-bake-SUBORD
 'I made the man sell the two breads I baked.'

This example also shows interesting interactions with agreement: the main clause has double agreement (with the animate singular incorporated object), notwithstanding the double incorporation (which should give rise to triple agreement); the stranded RC is glossed as having intransitive agreement, but we have reason to think that it may actually be a transitive prefix signalling an inanimate plural object (the form of the prefixes is the same in both cases).

One last case that must be mentioned is the one found in Eskimo languages, where names of typical foods are incorporated as whole phrases (like 'reindeer meat' below), unless the meat intended is that of a specific animal, which makes NI (more precisely, affixal predication) impossible. The examples are as follows (adapted from Sadock 1981:309):

- (21) a. *tuttu-p neq-aa-nik* [WEST GREENLANDIC]
 reindeer-GEN **meat**-3SG.P-INSTR
neri-vunga
eat-1SG.S.IND
 'I ate reindeer meat.'
- b. *tuttu-p neqi-tor-punga.*
 reindeer-GEN **meat-eat**-1SG.S.IND
 'I ate reindeer meat.'

On the theoretical level, these constructions could be considered another potential case of XP incorporation, but it must be said that it only works with lexicalized DPs (i.e. names of traditional foods and the like).

1.3.4. Modifier stranding

Maybe the most syntactic of all properties of NI constructions is the ability to strand modifiers. Examples like the following from Mohawk are very common in the languages that allow such constructions (Baker 1996:149):

Our main intent is to provide new typological data, paying special attention to less known RC types to be found in polysynthetic languages (defined as in par. 1.2 above); in doing so, we will start with the assumption that the variation attested in RC constructions cross-linguistically depends on general properties of phrase structures on the one side, and morphosyntactic properties of nominal expressions in individual languages on the other side. Secondly, we would like to specify that the relative structures exemplified here represent instances of restrictive RCs (unless otherwise stated), whose definition is given below (adopting the three-way typology proposed by Grosu & Landman 1998, quoted in Bianchi 2002:197):¹⁵

(25) Restrictive RCs (RRCs) are intersective modifiers of a nominal head, and contribute to determining the restriction of the determiner.

In the following object relativization from a polysynthetic language of the affixal predication type (Ahousaht Nuu-chah-nulth, from Wojdak 2005:130), the RRC not only modifies the nominal antecedent *ḥaa čakup-ʔii* ‘that man’, but also participates in the determiner’s restrictional properties, as can be seen from the mood/agreement suffix *-ʔiitq*, which is very probably related to the determiner *-ʔii* etymologically:

(26) *ḥačumsiqsaksiš* *ḥaa* [NUU-CHAH-NULTH]
ḥačumsiqsu-ʔak-siiš *ḥaa*
 brother-POSS=1SG.S.IND that
čakup-ʔii yaaʔinḥiʔitq *mary*
čakupʔi [RC *yaq-ʔinḥi[L]-ʔiitq*] *mary*
 man-DET REL-wait.for-3SG.S.REL Mary
 ‘That man who Mary is waiting for is my brother.’

On the syntactic level we can observe, in this example, that the RC comes after its head, as in many familiar VO languages (in similar cases, we will talk about *postnominal RCs*); on the morphological level, on the other hand, the RC forms one single grammatical (and phonological) word with the relative pronoun, by incorporating it into the predicate (a very unusual pattern, even in polysynthetic languages).

¹⁵ The other two types proposed by Grosu & Landman (1998) are *non-restrictive* (or *appositive*) relatives, which modify the whole head, and *maximalizing* relatives, whose head “is interpreted within the RC, where it provides a degree variable, and an operation of maximalization applies at the clause level” (Bianchi 2002:197).

As observed above in par. 1.3, the theoretical status of morphology is not very well defined at present, and the main hypotheses about it (which Schwarze (2007:1) calls the *negationist* and the *autonomist* positions) make very different claims. According to the former, what is normally considered morphology can be found in phonology, syntax, and even in the lexicon. Taking into consideration the syntactic level, morphology could represent the word level, which is defined at the interface with phonology, and is thus influenced by, but does not influence, syntactic structures.¹⁶ The autonomist position, on the other hand, formulates a specific hypothesis, i.e. *the Lexical Integrity Principle*, according to which syntax cannot see word-internal structures, and thus words are not defined in the syntax.

In this paper, we do not explicitly opt for either of these positions; what we will do, instead, is point out that, on the descriptive level, there is a certain kind of interaction between word-internal and phrase-level phenomena, even though we do not know exactly what processes underlie them. Some of the clearest evidence for this interface dimension comes from the process of RC formation in polysynthetic languages, where this morphology-syntax interaction is more apparent (since functional processes are expressed through a rich array of affixal morphology). In the next paragraph, we will be examining relativization strategies cross-linguistically, in order to identify their main morphosyntactic properties; following Greenberg (1963), we will show the existence of unexpected correlations between the order of the object with respect to the verb (OV vs. VO) and the order of the RC with respect to its head (RC H vs. H RC).

2.1. RC formation: complementation vs. nominalization

In this section we will introduce a certain number of relative constructions taken from VO languages such as Nuu-chah-nulth, OV languages like Japanese, Korean and Navajo, as well as the free word order language Mohawk (whose orders alternate between VO and OV). Following Greenberg (1963), we will assume that the relative order of RC and H and the VO vs. OV distinction are strictly related: if, on the one hand, VO languages show a preference for postnominal positioning of their RCs, OV languages, on the other hand, do not display a clear tendency for pre- or postnominal RCs.

Taking a VO language, Tseshaht Nuu-chah-nulth, as our starting point, we find that this language uses postnominal RCs (H RC), as well as a

¹⁶ Features such as agreement, tense and mood freely move across the word level.

complementizer in clause-initial position (the relativizer *yaq^w*), as in this object relativization (Davidson 2002:282):¹⁷

- (27) *čix^watwii?is ?ukłaa?akni* [NUU-CHAH-NULTH]
čix^wat-wi:?is ?u-(č)ła=?ak=ni
 eagle-in.bow Ø-be.called=POSS=1PL.S
yaq^wiiqqathqin
 [_{RC} *yaq^w-(y)i:q-qa·th=qa·=n*]
REL-travel.in-pretendedly=**DEF.REL=1PL.S**
 ‘Our imaginary canoe was called Eagle-Bow.’
 (lit. ‘That thing of ours which travels imaginarily...’)

As can be seen, (27) constitutes an instance of definite RC where the identity or existence of the referent is known or presupposed by both speaker and addressee, either from previous discourse or world knowledge (the fact that the speaker’s club have an imaginary canoe is deduced by a preceding sentence in the text where they are referred to as “thus many in a crew”). From a morphological point of view, we can see that the relative pronoun *yaq^w*- ‘that, which’ is incorporated into the affixal predicate ‘wait for’ together with a (definite) relative mood clitic.

On the contrary, the subject relativization in (28) corresponds to an indefinite RC where the referent’s identity (“grandfather”) is new or unidentifiable; moreover, on the morphological side, unlike the previous example, this RC exhibits a different incorporation pattern, as the relative pronoun is not incorporated into the verb, but rather stands alone, since it is not a root predicate and not an affixal one (Davidson 2002:283):

¹⁷ These complementizers have the typologically unusual property of serving as hosts for affixal predicates (if present), but also for all the functional suffixes (TMA, agreement) modifying the predicate of the RC.

- (28) *ʔuhita ʔiih ʔuuštaqyu* [NUU-CHAH-NULTH]
ʔuh=(m)it=a ʔi·h^w ʔu·š-(š)taqyu
 Ø=PST=IND big INDF.QUOT–having.power.from
yaquk^witiis naniqsu
 [_{RC} *yaq^w=Ø=uk=(m)it=(y)i:=s naniqsu*]
INDF.REL=be=POSS=PST=INDF=1SG.S grandparent
naayaqiiṯmaʔukn
naʔaq-(č)i:ṯ-maʔuk[L]
 baby–make–one.skilled.at
 ‘My former grandfather was a great maternity doctor.’
 (lit. ‘the one who was my grandfather...’)

In addition, the incorporation of relative pronouns resembles the pattern appearing in *wh*- questions; consider these Ahousaht examples (adapted by Davidson from Davis and Sawai 2001:130):

- (29) a. *ʔaqiicith John* [NUU-CHAH-NULTH]
ʔaqi-ʔiic-mit-ḥ John
what-consume-PST-3SG.S.INTERR John
 ‘What did John eat?’
- b. **ʔačaʔiicith suuḥaa*
ʔačaq-ʔiic-mit-ḥ suuḥaa
who-consume- PST-3SG.S.INTERR salmon
 ‘Who ate the salmon?’
- c. *ʔačaq-mit-ḥ ʔu-ʔiic ḥiṯas suuḥaa-ʔii*
who-PST-3SG.S.INTERR Ø-consume this salmon-DET
 ‘Who ate this salmon?’

We can observe that in the (a) example the *wh*- object pronoun *ʔaqi* ‘what’ is incorporated by the affixal predicate ‘consume’, while in (b) the incorporation of the *wh*- subject *ʔačaq* ‘who’ into the affixal predicate ‘consume’ is unacceptable; therefore, the *wh*- subject must appear independently, as in (c). Hence, as far as a VO language such as Nuuchahnulth is concerned, we can say that the correlation “if VO, then N RC” is respected, as the language typically displays postnominal RCs. However, the possibility of a subordinate clause following the verb or the noun it modifies would depend on the presence of initial complementizers: preverbal and

prenominal finite clauses will have final complementizers, while postverbal and postnominal ones will have their complementizers in initial position. We thus predict that, if VO languages allow postverbal subordinate clauses, then they should also allow postnominal RCs. This prediction is borne out by the Nuu-chah-nulth facts.

Turning our attention to Mohawk, an Iroquoian language showing true NI, we find different kinds of relative constructions; let us first consider the following example (Baker 1996:163):

- (30) *atyá?tawi* [_{RC} *tsi níkáya í-k-ehr-e?* [MOHAWK]
dress [_{RC} **which** Ø-1SG.S-think-IPFV
a-k-hnú-?] *ka-hutsf-nyu*
OPT-1SG.S-buy-PUNC] **3N.SG.S-be.black-DISTR**
 ‘The dress that I want to buy is black.’

In this postnominal object RC, we note that the relative pronoun *tsi níkáya* (morphologically related to the interrogative *ka níkáya* ‘which one?’) is not incorporated into the verb (as was the case with the Nuu-chah-nulth data).

However, the most common relative structure in Mohawk is very different from the one seen in (30): it consists of a verbal form which normally receives a nominal interpretation (Baker 1996:163):

- (31) *uwári ruwa-nákw-a-?s-e?* *ne* [MOHAWK]
 Mary 3F.SG.S/3M.SG.O-mad-Ø-BEN-STAT **NE**
 [_{RC} *ro-whahs-a-rátsu-Ø*]
3M.SG.O-skirt-Ø-tear-STAT
 ‘Mary is mad at the guy who tore her skirt.’

As we can see, in this sentence the “RC” (not a restrictive one) is preceded by the determiner-like element *ne*, and there is no relative head, but rather a NI construction used as a noun. Even if there is no trace of nominalizing morphology, this phenomenon, i.e. the existence of verbal forms with nominal meanings, follows from the fact that Mohawk has a rather small number of noun roots and no productive nominalizing morphology.

Let us now turn our attention to two languages instantiating Greenberg’s (1963:79) rigid OV type: Japanese and Korean. We assume the

correlation “if rigid OV, then RC N” to be correct;¹⁸ the following sentence illustrates a Japanese RC (Comrie 1998:71):

- (32) [_{RC} *inu o katte ita*] *kodomo ga sindesimatta* [JAPANESE]
 dog ACC keeping was **child** NOM died
 ‘The child that was keeping the dog died.’

In this subject RC, we recognize a prenominal RC modifying the noun *kodomo* ‘child’, which is morphologically identified through the use of the postposition *ga*, the nominative case assigner. Even though the absence of a relative pronoun or complementizer could lead us to think that this RC is an IP rather than a CP, we do not want to draw any conclusion about this. Among the several proposed explanations, Cinque (2005a) assumes that rigid OV languages would have unpronounced complementizers that do not attract the VP (in the case of complement and adjunct clauses) or the relative pronoun and the head (in the case of RCs).

Let us now examine a Korean RC and see in what respects it differs from Japanese (Jo 2002:114):

- (33) [_{RC} *John-i Mary-eykey cwu-n*] *chayk* [KOREAN]
 John-NOM Mary-DAT give-NMLZ **book**
 ‘The book that John gave to Mary.’

We notice the same lack of a relative pronoun as in the Japanese RC (32), whereas the nature of the *-n* morpheme is still unclear, as it could have more than one function: nominalizer or complementizer. More precisely, in this case it should be termed an “adjectivalizer”, since this construction has all the appearance of what in more familiar languages would be termed a *participial construction*. We endorse this position because the suffix, in this example, is added to the verb root before any TMA morphology. Not all of the Korean examples given by Jo support this assumption (and the author takes a quite different stand, assuming that tense features are contained in the suffix), but we believe that a distinction should be made between RC formations coexisting with overt TMA morphology and others excluding it.

The last instance of prenominal RC with a final complementizer (the enclitic morpheme *-igŭi* attached to the verb form) can be found in

¹⁸ With respect to non-rigid OV languages like Persian and many Indian languages, the author makes a different generalization: “if non-rigid OV, then N RC or both N RC and RC N.”

Navajo, a polysynthetic OV language of the Athapaskan family (Platero 1974:203):¹⁹

- (34) [_{RC} *athosh-igíí*] *ashkii athaa?* [NAVAJO]
 IPFV-3S-sleep-REL **boy** IPFV-3S-snore
 ‘The boy who is sleeping is snoring.’

We take the enclitic morpheme *-igíí* added to the verb form as a complementizer due to the presence of aspect morphology; the same kind of complementizer appears in the following nominalized RC which has a *naming function* (Willie 1989:413):

- (35) [_{RC} *nahachagíí*] *t’oo ahoyoi* [NAVAJO]
 3S-hop-REL too many
 (Literally: “the one who hops”)
 ‘There are too many grosshoppers.’

However, the most interesting aspect reported by Platero (1974:203) is the possibility of having postnominal RCs, as in (36); however, this example might be better analysed as an instance of *internally headed relative clause* (IHRC), as the head noun *ashkii* ‘boy’ appears in an argument position within the RC:

- (36) [_{RC} *ashkii athosh-igíí*] *athaa?* [NAVAJO]
boy IPFV-3S-sleep-REL IPFV-3S-snore
 ‘The boy who is sleeping is snoring.’

According to Platero, the surface forms of the prenominal RC found in Japanese, Korean and Navajo are produced by a syntactic process called *backward deletion*, i.e. the deletion of the lower NP of the embedded clause under identity with the head NP. In the prenominal RC in (34), indeed, the lower NP *boy* in the embedded clause may have been deleted, as it would have been identical to the head NP. With respect to the IHRC in (36), instead, we will say that it has been produced by *forward deletion*, i.e. the deletion of the head NP under identity with the lower NP of the embedded

¹⁹ When the tense is past, the form used is *-yéé* and it can assume different allomorphs (*-éé*, *-aa*) depending on specific phonological processes applying in different contexts.

clause. Adopting this analysis, the surface forms of both types of Navajo RCs would have the following underlying structure (Platero 1974:203):

- (37) [_{RC} *ashkii athosh-igíí*] *ashkíí athaa?* [NAVAJO]
 boy IPFV-3S-sleep-REL boy IPFV-3S-snore

In the next paragraph, we will focus on IHRCs, which constitute a relativization strategy mainly found in OV languages cross-linguistically, and especially common in native American ones.

2.2. RCs and subordination: IHRCs

In this section, we will examine a special type of relative structures, i.e. IHRCs, whose head appears in an argument position within the RC. Unlike restrictive RCs (observed in par. 2.1), which are connected to the noun phrase they modify, IHRCs are related not only to the internal verb of the RC, but also to the whole clause, because their head is, at least semantically (since it does not bear the case assigned by the matrix predicate) a constituent of the matrix clause.

Starting with rigid OV languages, we will show that there is a connection between the relative head and the NP it modifies, and also between the former and the verb of the matrix sentence. Consider the following Korean examples (Jo 2002:117):

- (38) a. *John-un* [_{RC} *khempyuthe-ka kocangna-n*] [KOREAN]
 J.-TOP computer-NOM out.of.order-NMLZ
kes-ul kochi-ess-ta
 thing-ACC fix-PST-DECL
 ‘John fixed the computer that is out of order.’
- b. **John-un* [_{RC} *khempyuthe-ka kocangna-ss-ta-nun*]
 J.-TOP computer-NOM out.of.order-PAST-DECL-COMP
kes-ul kochi-ess-ta
 thing-ACC fix-PST-DECL
 ‘John fixed the computer that is out of order.’

We can see that in (38a) the head noun *khempyuthe* ‘computer’ appears inside the RC and is related to the matrix verb (since it is both the semantic object of the main predicate and the RC subject), while the second head *kes* ‘thing’ seems to be a semantically empty noun (a *light noun*, to use our

terminology), which Jo defines as a pro-form occupying the NP node; on the contrary, in (38b), the clausal complement with CP structure appears to be ungrammatical.

It must be noted that native speakers find more natural the externally headed version, as in the following elicited example (Park Jin-Kyung, speaker):

- (39) *John-i* [_{RC} *kocangna-n*] *khempyuthe-lul* [KOREAN]
 J.-NOM out.of.order-NMLZ **computer**-ACC
kochi-ess-ta
 fix-PST-DECL
 ‘John fixed the computer that is out of order.’

A similar case of IHRC is found in Japanese (Mirasugi 1994, 1996, quoted in Jo 2002):

- (40) *keikan-wa* [_{RC} *doroboo-ga ginkoo-kara* [JAPANESE]
 policeman-TOP **robber**-NOM bank-ABL
detekita] *no-o tukamaeta*
 came.out **NO**-ACC arrested
 ‘The policeman arrested the man who came out from the bank.’

Here, the head *doroboo* ‘robber’ bears the nominative case, but also constitutes the object of the matrix verb; as in the Korean IHRC (38a), there is a second head *no*, which represents a semantically null element bearing the accusative case. To sum up, we can observe that when the position traditionally occupied by the head of a prenominal RC is empty, a dummy element like the above exemplified light nouns is selected.

Another instance of IHRC appears in the following Navajo sentence, whose head is the object of the embedded clause (Platero 1974:209) and the affixal complementizer *-(y)ęę* is attached to the verb:

- (41) [_{RC} *ashkii* *íééchaqʔi* *yiztal-ęę*] *nahaʔʔin* [NAVAJO]
 boy **dog** 3S-PFV-kick-REL IPFV-3S-bark
 ‘The dog that the boy kicked is barking.’

In this case, we assume that the process of *forward deletion* (seen in par. 2.1) has applied, and therefore we would claim that the IHRC in (41) has the following underlying structure, where the second occurrence of *dog* has been deleted under identity with the first one (Platero 1974:208):

- (42) [RC *ashkii lééchaqʔi yiztal-eɛ*] ~~*lééchaqʔi*~~ *nahaʔin* [NAVAJO]

The last example of IHRC we would like to consider is taken from Ancash Quechua (non-rigid OV type), a member of the B group of the Quechuan language family (Cole & Hermon 1994:247):

- (43) [RC *nuna-∅ bestya-ta ranti-shqa-n*] [A. QUECHUA]
 man-NOM horse-ACC buy-PST-3SG.S
alli bestya-m
 good horse-EVID
 ‘The horse that the man bought (is) a good horse.’

We can note that the head NP *bestya-ta* ‘horse’ bears the accusative case marker *-ta*, and is located between the subject and the verb of the modifying clause, since it is the DO of that clause. On the basis of the *phonetically null external head hypothesis* formulated by Cole (1987, quoted in Bianchi 1999:63), we would say that the modifying RC (whose head appears as its DO), is followed by a *phonetically null external head* (to be located right after the RC) which is anaphoric to the internal one.

Following Kayne’s (1994) assumption, prenominal RCs would have the same basic structure as postnominal RCs, as Bianchi (1999:64) shows:

- (44) a. [DP D° [CP C° [IP ... NP_{REL} ...]]]
 b. [DP D° [CP NP_{REL} [CP C° [IP ... t ...]]]]
 c. [DP [IP ... t ...] [DP D° [CP NP_{REL} [CP C° t_{IP}]]]]

According to this explanation, the RC originates inside of IP; successively, after the head has raised to [Spec, CP], as shown in (39b), there would be a further movement of the remnant IP of the RC from the complement position of CP to [Spec, DP], stranding a null complementizer (44c). According to Kayne (1994, quoted in Bianchi 1999:64), these RCs are IPs rather than CPs, and from the structure in (44c) he derives that of IHRCs. In order to achieve this, the raised head must be spelled out, whereas the head appearing in [Spec, CP] must be deleted, as shown in (45), since it does not c-command its trace within the raised IP:²⁰

²⁰ This deletion is allowed since it respects the principle whereby “the deleted link of a chain cannot c-command the phonetically realized one” (Bianchi 1999:64).

(45) [DP [IP ... [_iNP]_i ...] [DP D° [CP [NP *e*]_i [CP C° t_{IP}]]]]

The main difficulty with this approach lies in the impossibility of testing the existence of null complementizers. Another question is: why should a relative head move further up to create a complex construction such as an IHRC? This analysis has nothing to say about this.

An alternative hypothesis about IHRCs, which has not yet been proposed (to our knowledge, at least), is that this kind of relativization structures could actually be not so much the result of complex constituent movements, but rather the nominalization of whole sentences whose constituents show up in their basic order. With this proposal, there is no need of testing the existence of null complementizers, since the only relevant parameter becomes the basic word-order type of the language in question. An interesting correlation on this point is that IHRCs are typical of OV languages, and it is precisely in these languages that subordinate clauses tend to precede their main clauses, as more generally modifiers precede their heads. “Internal-headedness” would thus find a reason to exist in that it would be a way of making a RC a modifier of a clause rather than just a constituent, thereby bringing RC formation in line with other forms of subordination.

But why, then, are they especially common in *polysynthetic* languages? Polysynthesis is essentially a head-marking tendency, and the main word of a sentence (in a synthetic language) is the verbal complex. This said, we predict that RCs should follow the trend of other modifiers in establishing a direct relation with the main head of the sentence, rather than just with the relative head; polysynthesis would thus point in the same direction as OV word order, in this case. The matter is worthy of further investigation.

2.3. IHRCs and incorporation: the Mohawk case

In the previous paragraph we have considered examples of IHRCs taken from OV languages; however, structures labeled as such can also be found in languages with so-called ‘free word order’ such as Mohawk. The clearest instances of IHRCs in Mohawk are, as we shall see, those where the relative head is incorporated in the verb of the RC, and are thus a function of NI rather than a verb-final feature.

Let us first consider an example without NI, in order to understand the basic principles regulating RCs in this language (Baker 1996:163):

- (46) *sak ra-núhwe?-s* [_{RC} *tsi níkáya i: k-úni-s* [MOHAWK]
S. 3M.SG.S-like-HAB **which** me 1SG.S-make-HAB
ne áthere]
NE basket
'Sak likes the (kind of) baskets that I make.'

This sentence exhibits a different position of the head (which, in this case, is the RC object), if compared to the IHRCs considered in the previous paragraph; here, the head is located at the end of the embedded clause, but even though it is not contiguous with the relative pronoun, it refers to the same argument as the latter, i.e. *áthere* 'basket', the object of the RC predicate. A possible alternative view is to interpret the object as an afterthought DP, a viable option, since Mohawk allows free argument dropping.²¹ This ambiguity was not found in the IHRCs considered in the preceding paragraph, since it was prevented by the rigid OV word order.

A clearer case of IHRC is the following, where the head is incorporated into the dependent verb; here too the head is separated from the relative pronoun (Baker 1996:173):

- (47) *uwári wa-huwá-[i]tahr-e?* **ne** [MOHAWK]
Mary DEF-3F.SG.S/3M.SG.O-pity-PUNC **NE**
[_{RC} *wa?-ke-ksá-ht-a-ya?k-e?*]
DEF-1SG.S-**child-NMLZ-Ø-hit**-PUNC
'Mary pitied the child I slapped.'

A similar NI pattern appears in the following RC found in Southern Tiwa (Allen & al. 1984:308), where the relative head is incorporated into the dependent verb; in this case, a subordinating affix appears, unlike the preceding Mohawk example, where nominalization was implied by the use of the determiner-like element *ne* :

²¹ A good way to distinguish between the two interpretations could be to consider intonational factors, but these are not available in ordinary text transcriptions or in literature dealing with morphosyntactic issues.

- (48) [_{RC} *bi-k'uru-tha-ba-ʔi*] [SOUTHERN TIWA]
 1SG.S/3IN.O-dipper-find-PAST-SUBORD
i-k'euwe-m
 3IN.S-be.old-PRES
 'The dipper I found is old.'

In (47) and (48), the internal heads (*ksa-* 'child' and *k'uru-* 'dipper' respectively) are incorporated into the verbs within the RCs (and thus occupy a fixed position), but when they are not incorporated, the relative head can be placed quite freely on either side of the RC; here are some Mohawk examples (Baker 1996:174):

- (49) a. *sak wa-hó-[a]ʔi-ʔ* *ne áthere?* [MOHAWK]
 S. DEF-3M.SG.O-lose-PUNC NE basket
 [_{RC} *wak-hnínu-Ø*]
 1SG.O-buy-STAT
 'Sak lost the basket I bought.'
- b. *sak wa-hó-[a]ʔi-ʔ* *áthere?*
 S. DEF-3M.SG.O-lose-PUNC basket
ne [_{RC} *wak-hnínu-Ø*]
 NE 1SG.O-buy-STAT
 'Sak lost the basket I bought.'
- c. *sak wa-hó-[a]ʔi-ʔ*
 S. DEF-3M.SG.O-lose-PUNC
ne [_{RC} *wak-hnínu-Ø*] *áthere?*
 NE 1SG.O-buy-STAT basket
 'Sak lost the basket I bought.'

These sentences are given as semantically equivalent: it may be interesting to know if there are any differences in topicality among them.

To conclude, what can we learn from all these complex and heterogeneous data? Resuming the thread of the interface relation between syntax and morphology we discussed at the beginning of this paper, we believe that the cross-linguistic expression of RC constructions, and IHRCs in particular, may be taken as a genuine instance of it.

In polysynthetic languages of the *true incorporating* type like Mohawk and Southern Tiwa, in particular, the process of NI shows us a morphological dimension of RC formation not found elsewhere: in these

languages, the word level varies in accordance with the conditions regulating NI, even in RCs.

In affixal predication languages like those of the Wakashan family, on the other hand, the most peculiar pattern is the incorporation of *wh*-pronouns and relativizers, a fact unknown to other languages, even of the polysynthetic type.

Finally, nonconcatenative polysynthetic languages like Navajo have a relativization strategy which is in many respects similar to the one found in rigid OV (nonpolysynthetic) languages like Korean and Japanese, with the differences that:

- the complementizer is definitely an affix from a morphological point of view;
- it is always a real complementizer, and not simply a derivational nominalizing suffix creating verbal nouns;
- the formation of IHRCs shows that a process of *forward deletion* of the relative head (explained in par. 2.1) applies, but while in Japanese and Korean, on the one hand, such a process requires the presence of a semantically empty noun (performing an anaphoric function analogous to that of a resumptive clitic), in Ancash Quechua and Navajo, on the other hand, a gap appears.

But the most interesting data are without a doubt those exposed in the last paragraph, where we have detected interactions between RC formation and NI. Let us further explore these interactions in the next paragraph.

3. Types of interactions between NI and RCs

So far, we have been pursuing the hypothesis that there is an interface relation between syntax and morphology, which shows itself clearly (and independently) in each of the two phenomena surveyed in this paper. The two constructions in question, in turn, display interesting interactions, which will be examined in this paragraph.

3.1. Incorporation of the relative head

Interactions between NI and RC formation may involve the incorporation of the relative head. This may be incorporated in two different positions, i.e. within the RC and into the matrix verb. Let us examine each of the two possibilities in turn.

3.1.1. Within the RC

This case can be clearly illustrated through the following Mohawk examples (Baker 1996:170):

- (50) *te-yu-[a]hsa?tho-s ne tsi* [MOHAWK]
 DUPL-3F.SG.S-cry-HAB because
wa?-te-w-át-ya?k-e?
 DEF-DUPL-3N.SG.S-SREFL-break-PUNC
thika [_{RC} *yako-ya?tuni-hser-fhs-u*]
 that 3F.SG.O-doll-NMLZ-finish-STAT
 ‘She is crying because the doll that she made broke’

As can be noted, this is a definite RC incorporating its head ‘doll’ into its verb. This RC bears no special morphology, since there is no complementizer or relative pronoun, and NI leaves a demonstrative modifier stranded; the IN is then understood as subject of the predicate ‘break’, and it has been incorporated even though it is specific, a typical feature of polysynthetic languages (in Baker’s sense, i.e. what we call *true incorporating languages*). The referential status of the IN may also be inferred from the presence of a nominalizer, as well as a stranded demonstrative.

A more complex pattern is when the verb shows applicative morphology as can be seen in the following example (Baker 1996:163):²²

- (51) *tsi nikáya ne* [_{RC} *wa-hiy-ahtha-hk[w]-úny-A-?*] [MOHAWK]
 which NE DEF-1SG.S/3M.SG.O-shoe-NMLZ-make-BEN-PUNC
ro-[a]tshánúni
 3M.SG.O-be.happy.STAT
 ‘The one who I made shoes for is happy’

This construction corresponds to RCs introduced by PPs (or preposition stranding) in more familiar languages like English; nevertheless, the benefactive argument is to be understood as a DO in Mohawk. The IN here is not necessarily specific, but still, it has to be considered referential since it bears a nominalizer.

²² By ‘applicative morphology’ we mean the process whereby oblique arguments may be advanced to the status of direct objects by means of special derivational morphology attached to the verb base.

Due to the possibility of incorporating specific elements, we expect this pattern to be only found in true incorporating languages such as Mohawk and Southern Tiwa, and not in affixal predication languages like Nuu-chah-nulth. So far, we have found no counterexamples to this claim.

3.1.2. Within the matrix clause (with RC stranding)

This pattern is the opposite of what we have outlined in the preceding section: to clarify the difference, let us consider the following example pair from Southern Tiwa (Allen & al. 1984:308):

- (52) a. [_{RC} *bi-k'uru-tha-ba-ʔi*] [SOUTHERN TIWA]
 1AN.SG.S/3IN.SG.O-**dipper-find**-PST-SUBORD
i-k'euwe-m
 3INAN.SG.S-**be.old**-PRES
 'The dipper I found is old.'
- b. *i-k'uru-k'euwe-m*
 3IN.SG.S-**dipper-be.old**-PRES
 [_{RC} *bi-tha-ba-ʔi*]
 1INAN.SG.S-**find**-PST-SUBORD
 'The dipper is old that I found.'

In both cases, the IN is the subject of the matrix clause and the object of the RC; in the (a) sentence, the relative head is incorporated into the RC, as illustrated in the preceding paragraph. Most interesting is the case in (b), where the relative head is incorporated into the matrix verb. Alternations like the one in question are explained by the authors as the incorporation of the head noun into "whatever comes first in the sentence." Starting with this assumption, we may propose that the starting point for the (a) sentence is a prenominal RC (RC N V), whereas the one in (b) may possibly be explained as a case of afterthought, starting from a structure like N V [RC] or V [RC N] (afterthought in parentheses).

There is even a case where a caused subject in a causative verb construction is incorporated, the noteworthy fact being that the matrix verb also has an IN: it was seen in (20) above, repeated here again as (53):

- (53) *ti-seuan-p'akhu-kumwia-?am-ban* [SOUTHERN TIWA]
 1AN.SG.S/3AN.SG.O-man-bread-sell-CAUS-PST
wisi [_{RC} *te-khaba-?i*]
 two 1AN.SG.S/3IN.PL.O-bake-SUBORD
 'I made the man sell the two breads I baked'

The derivation proceeds as follows: first of all, the object is incorporated into the matrix verb; then the whole NI construction is incorporated into the causative verb, which is a lexical stem meaning 'make'. This complex stem is in turn able to incorporate the caused subject of the sentence. The inner NI is not lexicalized, it is referentially very active, as the two stranded modifiers (a numeral and a RC) modify the internal object. This may be considered a case of *recursive NI* (the only one we know of).

3.2. Incorporation of relativizers (Nuu-chah-nulth)

This phenomenon can be observed in the following definite postnominal RC from Tseshaht Nuu-chah-nulth (Davidson 2002:281-2):

- (54) *!aqsañap* *!uucsme?i* [NUU-CHAH-NULTH]
!aq^w-sañap *!uucsma=?i*
 soft.mass-lie.on.beach.CAUS.PFV woman=DET
?intmis?i *yaq?atu?itq* *?int?atu*
?int-mis=?i: [_{RC} *yaq^w-?atu=?i:tq*] *?int-?atu*
mucus.mass=DET REL-come.off.PFV=DEF mucus-come.off.PFV
 'The woman threw the mucus that had come out down on the beach.'

As can be seen, this is an instance of object relativization whose relative marker is incorporated into the affixal predicate, unlike other polysynthetic languages such as Mohawk.²³ Nuu-chah-nulth headless RCs (which are not the topic of our paper) show a similar pattern with the *wh*-pronouns that introduce them, with the usual restrictions dictated by the thematic grid of the affixal predicate (incorporation of transitive objects and unaccusative subjects only). This peculiar pattern (only to be found in the Southern branch of this language family) is due to the bound nature of affixal predicates, which, as pointed out in par. 1.1, differ radically from the incorporating verbs found in languages with true NI. Affixal predication languages, in

²³ We have to note that the affixal predicate is then repeated, incorporating the head noun. This fact may fall under the rubric of afterthought phenomena.

turn, place selectional restrictions on what may be incorporated into an affixal predication constructions: Eskimo languages, which also display such constructions, cannot incorporate relative markers. Nuu-chah-nulth affixal predicates, on the other hand, cannot incorporate demonstratives (though they can incorporate quantifiers). The ultimate nature of such restrictions is yet to be discovered.

3.3. Incorporation of the whole RC?

The following case of incorporation of a whole RC is reported for the Siouan language Crow (Graczyk 2007:200):

- (55) a. [_{RC} *ak-dii-ammalapáshkuua-ss-aa-lee*]-*waa-chiin-moo-k* [CROW]
 [_{RC} REL-**2O**-Billings-GOAL-PORTATIVE-go]-1A-look.for-INCL-DECL
 ‘We’ll look for someone who [will] take *you* (not someone else) to Billings.’
- b. [_{RC} *ak-ammalapáshkuua-ss-dii-aa-lee*]-*waa-chiin-moo-k*
 [_{RC} REL-Billings-GOAL-**2O**-PORTATIVE-go]-1A-look.for-INCL-DECL
 ‘We’ll look for someone who [will] take *you to Billings*
 (not somewhere else).’

As can be observed, however, the problem now becomes whether this (headless) RC may actually be considered incorporated in the matrix clause, or rather an independent subordinate. About this, we have to observe that Crow RCs, as described by Graczyk, most commonly end with a definite affix (-*sh*), which is crucially absent in this example for reasons of semantic incompatibility (the RC modifies an indefinite argument); this may lead us to think that the whole RC is incorporated, as Crow INs normally appear outside of agreement; nevertheless, cases of (orthographically free-standing) RCs without a final morpheme are attested elsewhere in the language. We also have to note that the position of the object marker (-*dii*) is different in (a) and (b), a difference due to topicality reasons; this behavior, however, is more typical of clitics, and we would not expect it from an agreement marker. This may have implications on two levels:

- on the one hand, the RC could be considered a separate grammatical word (although it certainly is one phonological word).
- on the other hand, the morphological status of object agreement is not clear: it might be a morpheme that may occupy two different slots or else a clitic. If the latter case should prove true, the RC

would be best analysed as composed of several functional (and lexical) words.

At present, we cannot decide whether these sentences are actually single words: the problem has to do with the distinction between grammatical and phonological words (one of the most debated in contemporary linguistic theory in general, and in polysynthetic languages in particular).

In any case, the above sentences may be considered single words on the phonological/orthographical level (they bear only one main accent, as indefinite elements are more likely to be backgrounded); on the grammatical side, we are not in a position to make a claim about their wordhood.

To sum up, the interactions between NI and RC formation may be of at least two types: the first is the incorporation of the relative head (inside the RC or the matrix clause). The second type is exemplified by the Nuuchah-nulth language, which may incorporate a relative marker. Finally, it is possible (even though not certain) that in some cases whole (nonlexicalized) RCs may be incorporated in the Siouan language Crow.

4. Conclusions

The main purpose of this paper was to give an idea of the multiformity that morphological phenomena may assume in a cross-linguistic perspective. Starting with the assumption that both the phenomena we have chosen involve an NP (as a modifier in the case of NI and a head in the case of RRCs), we have seen that, in fact, it is extremely difficult to make universal statements about the key concept of morphology, i.e. the word, especially when polysynthetic languages are involved. The two phenomena we have chosen share the property of being defined with respect to an argument or an adjunct (rather than a predicate).

Nevertheless, in NI constructions, the argument or adjunct fails to acquire wordhood and, in some languages, this is so even when it is highly referential (as e.g. when it is modified by a demonstrative and/or a RC, which appear stranded).

RRCs, on the other hand, are expected to stop short of interacting with NI constructions, since they contribute to the referentiality of the head (by making it specific). As a matter of fact, they do interact with NI in at least two classes of languages (true incorporating languages and one branch of a language family with affixal predication, Wakashan, where the interaction extends to headless RCs).

But this is not the whole story, as relativization in polysynthetic languages may take on the form of IHRCs: these may be conceived, we

propose, as nominalizations of whole sentences whose constituents show up in their basic order. This could be a way of turning a RC into a modifier of a clause (instead of an NP), a typical feature of subordination in verb-final languages; this is the case in Navajo and Quechua. Or maybe, the IHRC actually becomes something like a dislocated argument. But even in non-verb-final languages like Mohawk or Southern Tiwa we can note a form of IHRC: in these languages, the internal head is not so much the product of verb-final properties, but rather the by-product of a NI process whose properties and restrictions vary from language to language, as they are generated by a complex network of interactions between syntactic, semantic and phonological motivations.

But what is the place of morphology? Does it play its role as an autonomous component of the mental grammar, or is it just an interface, as Halle & Marantz (1993) claim? The data presented in this paper show clearly that the interface exists, and that it is very complex. But the difficulty of making generalizations about the status of the word and where its level begins and ends makes it very difficult to talk about a unified component of UG reserved to the creation of words. Whether it exists or not is beyond the scope of this paper; nevertheless, the great deal of variation that natural languages display in forming their words must be taken into account by any theoretical approach.

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