Noun incorporation, doubling and possessor raising: against φ-deletion[*]

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We review Baker *et al.*'s (2005) analysis of noun incorporation in Iroquoian and Mapudungun. Baker *et al.* propose that cross-linguistic differences in noun incorporation constructions result from differential modes of deletion of φ-features from the copies of moved elements. The current study outlines various empirical and theoretical problems with their analysis and proposes instead a structural analysis that captures a wider range of empirical facts. We propose that in Iroquoian languages the incorporated noun and the full DP double form a constituent upon Merge, while in Mapudungun they do not. We then derive the differences in noun incorporation between these two language groups with these two structures.

1 Introduction

Noun incorporation (NI) is far from a unitary phenomenon (Baker *et al.*, 2005, Mithun, 1984, Rosen, 1989). For instance, NI can involve doubling/stranding or not; obviate agreement or not; and take place with unaccusatives or not. NI also interacts with inalienable possession in different ways in languages with this construction. Baker *et al.* propose that this variation can be captured by parameterizing φ-feature deletion in traces (or copies of movement). We show below, however, that this proposal is problematic both theoretically and empirically. We propose instead a structural explanation.

We propose that this variation can be captured by positing two basic structures for NI shown in (1). In (1)a, the item that undergoes NI is introduced by a functor, RP (Restrictor Phrase), which takes DP as a complement, while in (1)b, the verb selects a bare nominal root (N^0) (or a reduced nominal expression, *n*P) as a complement, which then undergoes NI. These two structures can account for the points of variation mentioned above.

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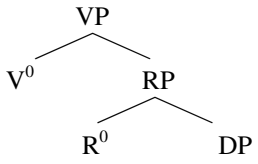
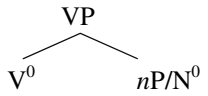
(1) a. 

b. 

The structure in (1)b is essentially the same as in Baker (1988). The structure in (1)a is novel; however, it is reminiscent of Boeckx's (2003) treatment of resumptive pronouns, (2)a, Uriagereka's (1995) treatment of clitic doubling (2)b, and Kayne's (2002) treatment of pronominalization, (2)c.

(2) a. $[_{\text{Big DP}}$ RP $[_{\text{DP}}]]$
b. $[_{\text{DP}}$ CL $[_{\text{DP}}$ DP$]]$
c. John thinks $[_{\text{CP}} [_{\text{DP}} t_{\text{John}}$ he] is smart]

We will show that languages that make exclusive use of the structure in (1)b will not exhibit doubling/stranding, agreement with the IN and will not have NI with unaccusatives.

The remainder of this paper is organized as follows. Section 2 introduces the data on NI and outlines the generalizations that the analysis will account for. Section 3 discusses previous approaches to NI, in particular, that of Baker (1988) and Baker *et al.* (2005) and reviews some shortcomings of these analyses. Section 4 presents the current analysis. Section 5 is a brief conclusion.

2 Patterns of Noun Incorporation

2.1 NI in Iroquoian

We discuss NI primarily from Onondaga (Iroquoian).[1] NI in Onondaga (as in other Iroquoian languages) can be doubled or can appear with stranded modifiers, (3) (Baker, 1988, Mithun, 1984, Woodbury, 1975).[2]

(3) a. waʔgnasgwahní:nǫʔ gwísgwis

waʔ-	k-	naskw-	hninǫ-	ʔ	kwiskwis
FACT-	1.SG.NOM-	animal-	buy-	PUNC	pig

'I bought a pig.'

[1] All Onondaga data is from original fieldwork, unless otherwise noted.

[2] The following abbreviations are used in this paper: ACC – accusative, BEN – benefactive, CAUS – causative, CIS – cislocative, EPEN – epenthetic, F – feminine, FACT – factive (a type of mood), IND – indicative, NOM – nominative, NZLR – nominalizer, OBJ – object, SG – singular, STAT – stative (akin to perfect aspect), SUBJ – subject, PUNC – punctual (akin to perfective aspect).

b. waʔgnakdahní:nǫʔ nęgeʔ

waʔ-	k-	nakt-	a-	hninǫ-	ʔ	nękeʔ
FACT-	1.SG.NOM -	bed-	EPEN-	bed-	PUNC	this

'I bought this bed.'

Thus, in (3)a, the incorporated nominal element is *-naskw-* ('animal') and the double is the full DP *gwísgwis* ('pig'). In (3)b, the demonstrative *nęgeʔ* ('this') modifies the nominal referring to the bed. Baker (1988) contends that stranding constructions of this sort are evidence for his syntactic analysis (presented below). In short, Baker argues that the nominal root incorporates into the verbal root, stranding the modifier (here, a demonstrative). Rosen (1989) shows that stranded modifiers are found in Mohawk irrespective of NI. For her, stranding is simply the result of *pro*-drop, which is widely available in this language. Thus, Rosen argues, if Baker wishes to maintain his model of NI and stranding, he would require two mechanisms for stranding: the one just described for stranding in NI constructions, and one for ordinary *pro*-drop constructions. We return to this topic below.

Onondaga also exhibits both agreeing and non-agreeing NI, where the agreeing form appears in NI constructions with inalienable possession (aka 'Possessor Raising', see Michelson, 1991), (4) or with animate objects, (5).[3]

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[3] Koenig & Michelson (2008) also present the following Oneida data, where the IN appears to be referenced by agreement (their (7) and (8)).

i. wa?-shakoti-ksa?t-áks(ʌ)-a-ht-e?
FACT-3.NOM.3.SG.F.ACC-child-be.bad-EPEN-CAUS-PUNC
'they spoiled her, the child'

ii. wa?-khey-atʌlo?sl-úny-ʌ-?
FACT-1.SG.NOM.3.SG.F.ACC-friend-make-BEN-PUNC
'I made friends with her'

There exist, however, instances of NI with animate INs in which agreement with the IN is not manifested, in particular with *baby* as the IN.

iii. waʔgwiyähaeʔ

waʔ-	k-	wiR-	ohae-	ʔ
FACT-	I-	baby-	wash-	PUNC

'I washed the baby.'

It is possible that the Oneida examples here actually contain incorporated predicate nominals and the internal arguments referenced by the verbal agreement are the underlying subject of the predicate nominal. Also, babies and infants are often treated either as neuter or as masculine/feminine in many languages, perhaps explaining the lack of agreement in iii. Baker (1996: 319) discusses further inconsistencies with respect to agreement. I leave these problems for future research but stick with the basic premise the agreement is found in NI constructions in Iroquoian and must be dealt with.

(4) a. waʔkhenętshohaeʔ

waʔ-	khe-	nętsh-	ohae-	ʔ
FACT-	I:her-	arm-	wash-	PUNC

'I washed her arm.'

b. *waʔgnętshohaeʔ

waʔ-	k-	nętsh-	ohae-	ʔ
FACT-	I-	arm-	wash-	PUNC

('I washed her arm.')

(5) waʔkheyaʔdohaeʔ (neʔ Meri)

waʔ-	khe-	yaʔd-	ohae-	ʔ	neʔ	Meri
FACT-	I:her-	body-	wash-	PUNC	NE	Mary

'I washed her (Mary).'

Finally, NI can take place with unaccusatives, (see also Rice, 1991).

(6) waʔgeʔsehdatgihdaʔ

waʔ-	k-	e-	ʔseht-	a-	tki-	ht-	aʔ
FACT-	1.SG.NOM-	EPEN-	car-	EPEN-	dirty-	CAUS-	PUNC

'I got the car dirty.'

In sum, NI in Iroquoian can be doubled or participate in stranding constructions, can appear with object agreement in NI constructions (at least some of the time), and can undergo NI with unaccusatives. We now turn to a brief description of NI in Mapudungun.

2.2 NI in Mapudungun

In contrast, Mapudungun does not allow doubling/stranding or exhibit agreement with IN. Also, Mapudungun does not allow NI with unaccusatives, unless the construction is accompanied by possessor raising (Baker *et al*., 2005).[4] Consider first doubling and stranding. The following examples show that doubling and stranding is not permitted in Mapudungun.[5]

[4] Note that we cannot boil the availability of NI with unaccusatives down to a single parameter. Hirose (2003) shows that NI is unavailable for *static* unaccusatives in Plains Cree (such as adjectives), but is available for *dynamic* unaccusatives (such as *arrive*, *fall*, etc.) in that language. Note also that Baker *et al.* admit that "Mapudungun *usually* does not (admit NI in unaccusatives)" [emphasis mine]. Thus, it is clear that more research must be done on the syntax of NI with unaccusatives.

[5] All Mapudungun examples are taken from Baker *et al.* (2005).

(7) a. Juan ngilla-waka-lel-fi-y
Juan buy-cow-BEN-3.OBJ-IND.3.SG.SUBJ
'Juan bought a cow for him.'

b. * Pedro ngilla-waka-y tüfachi (waka)
Pedro buy-cow-IND.3.SG.SUBJ this (cow)
('Pedro bought this cow.')

Unlike Iroquoian languages, Mapudungun has overt agreement with 3rd person neuter arguments. This agreement disappears, however, in NI construction, as the following examples illustrate.

(8) a. ngilla-fi-ñ ti waka
buy-3.OBJ-IND.1.SUBJ the cow
'I bought the cow.'

b. *ngilla-waka-fi-n
buy-cow-3.OBJ-IND.1.SUBJ
('I bought a cow.')

Finally, the following examples show that NI is illicit in unaccusatives, unless accompanied by possessor stranding.

(9) a. * lüf-ruka-y
burn-house-IND.3.SUBJ
('The house burned down.')

b. Juan lüf-ruka-y
Juan burn-house-IND.3.SUBJ
'Juan's house burned down.'

The following chart summarizes the differences in NI between Iroquoian and Mapudungun. We turn next to previous analyses of NI.

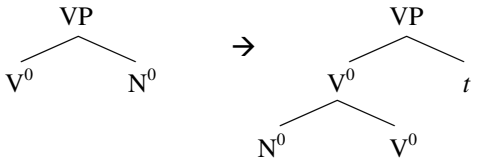
Iroquoian		Mapudungun
available	doubling and stranding	not available
agreement often found with IN	agreement	agreement never found with IN
NI freely available	unaccusatives	NI available only if accompanied by possessor stranding

3 Previous Analyses

3.1 Baker 1996

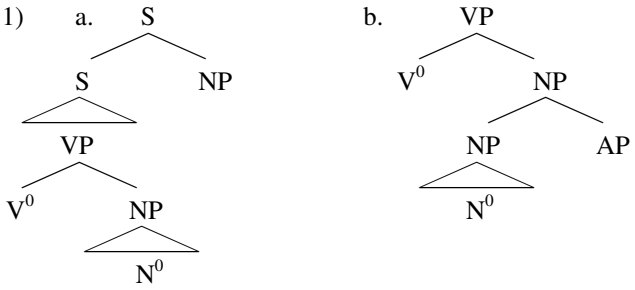
Baker (1988, 1996) proposes that NI proceeds by head movement, specifically, by N^0-to-V^0 raising, for both Mohawk (with left-head-adjunction, as shown) and Mapudungun (with right-head-adjunction, not shown).

(10)



Doubling and stranding are problematic for a syntactic account of NI.[6] Baker's (1996) solution was to base generate the doubled or stranded material in an adjoined position. Specifically, doubled nominals (in fact, all full nominal expressions) are argued to be in adjoined, clause-peripheral positions, and thus do not interfere with N^0-to-V^0 head movement, (11)a. Stranded material (represented as AP in the example below) is adjoined to the nominal complement to the verb itself, and thus also does not interfere with incorporation, (11)b.

(11)



For *wh*-movement, which is demonstrably active in Northern Iroquoian, the *wh*-phrase must originate in situ and raise to the left periphery. Crucially, this means that the *wh*-phrase must be merged in argument position, since A-bar movement from an adjoined position is impossible. This predicts that *wh*-

[6] In fact, the presence of doubling was one argument against a syntactic account of NI in favour of a lexical analysis (Rosen, 1989). The current analysis, however, adopts the single-engine hypothesis of morphology and syntax and does not assume a generative Lexicon in UG (Compton and Pittman, 2007, Julien, 2002, Marantz, 1997).

movement is impossible with NI constructions.[7] Observe in (12) that *wh*-movement and NI can co-occur (contra Baker, 1996).

(12) a. nwadęʔ waʔsnasgwahní:nǫʔ

nwadęʔ	waʔ-	s-	nasgw-	a-	hninǫ-	ʔ
what	FACT-	you-	animal-	EPEN-	buy-	PUNC

'What did you buy?' (kind of animal presupposed)

b. gaęnigáeʔ gwísgwis waʔsnasgwahní:nǫʔ

gaęnigáeʔ	gwisgwis	waʔ-	s-	nasgw-	a-	hninǫ-	ʔ
which pig		FACT-	2.SG-	animal-	EPEN-	buy-	PUNC

'Which pig did you buy?'

3.2 Baker *et al.* 2005

Baker *et al.* capture the difference between Mapudungun and Mohawk by arguing for φ-feature deletion upon movement. When an XP raises, it leaves a copy. Baker *et al.* propose that the φ-features of the copy can either remain, be reduced to default values, or be erased. Specifically, in Mapudungun, φ-features are deleted upon N-raising, thus completely obviating agreement in that language. In Mohawk, φ-features are reduced to default values, giving rise to default agreement (which happens to be Ø, resulting in the appearance of no agreement). And in Southern Tiwa, the φ-features of the copy of N-raising remain, thus giving rise to full agreement in NI constructions.

This approach suffers from various problems, however. Under the copy theory of movement, copies are deleted at PF. Thus, the φ-feature deletion process that drives the analysis does not take place until after Spell-Out. So, it is unclear how agreement could have access to this information. Baker *et al.* also argue that only NI with agreement can license stranded modifiers; thus, they must posit Ø agreement in Mohawk to account for (3)b. This, however, predicts transitive agreement with NI constructions, a prediction which is not borne out. Subjects of intransitives in the perfect aspect are marked with object agreement while subjects of transitives are marked with subject agreement. (13) shows that the subject is marked with object agreement, thus no Ø agreement marker for the object can be present.

(13) agadęnaʔtshähni:nǫ́h (Woodbury, 2003)

ag-	adęnaʔt-	shR-	a-	hninǫ́-	h
1.SG.ACC-	groceries-	NZLR-	EPEN-	buy-	STAT

'I have bought groceries.'

[7] Baker (1996) does acknowledge this issue and discusses it in detail. In short, he tries to argue that NI is indeed impossible with *wh*-constructions. The data presented here clearly contradicts Baker's conclusions, however.

Given the various problems with the analyses outlined above, we turn to the current proposal.

4 Current Analysis

We begin our analysis by first taking a closer look at the IN in Onondaga.[8] Note that the incorporated element in NI constructions can contain more than simply a bare root. For instance, (13) shows that the IN can appear with a nominalizer. The nominalizer appears whenever the incorporated root is a verbal root rather than a nominal root. However, noun class morphology (called the noun forming suffix, NFS, in traditional Iroquoian literature) cannot appear in NI constructions. Thus, we propose that the IN consists minimally of a bare nominal root or a bare verbal root plus nominalizer.

(14) a. N^0 b. $[_{nP}\ V^0\ n^0\ ]$

We propose that the incorporated nominal element and the double are merged as a constituent and the nominal element undergoes NI, while the double either remains in situ or raises to a position of topic or focus. Thus, the underlying and surface structures for (3)a are as in (15). Specifically, the IN appears in the specifier of RP since it can be structurally complex, (14)b.[9]

(15) $[_{VP}$ buy $[_{RP}$ animal R^0 $[_{DP}$ pig $]]]$ → $[_{VP}$ animal-buy $[_{RP}\ t_{animal}\ [_{DP}$ pig$]]]$

We now discuss how the proposed structures for NI account for the observed differences in NI in Iroquoian and Mapudungun. In particular, we discuss doubling/stranding, agreement with NI, and NI with unaccusatives.

4.1 Doubling and Stranding

We begin our discussion with the doubling and stranding facts pointed out above, recalling that this process is available in Iroquoian, but not in Mapudungun. Recall that Rosen (1989) points out that stranding is available irrespective of NI. The two structures we propose for stranding, then, are as follows.[10]

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[8] The facts presented on Onondaga hold for Northern Iroquoian in general.

[9] Elsewhere (Barrie, 2008) I argued that function of the element in SpecRP (the IN) is to semantically restrict the domain of interpretation of the predicate in the sense of Chung & Ladusaw (2004), thus ensuring that the DP is a sub-type of the IN.

[10] I am not making any firm claims on the internal structure of nominal constructions in Onondaga. In (16), I merely place the demonstrative in a DemP for convenience, pending future research into the nature of demonstratives in Iroquoian. Also, it is unclear whether *pro* is a true null pronominal or is a null equivalent of *one* as is found in English *one*-replacement constructions.

(16) a. $[_{RP}$ IN $[_{DemP}$ DEM $[_{DP}$ *pro*]]]
b. $[_{DemP}$ DEM $[_{DP}$ *pro*]]]

Thus, stranding in NI constructions and in ordinary *pro*-drop constructions arise by the same mechanism. The difference between the two is whether the DP is introduced by a Restrictor Phrase hosting an (about to be) incorporated nominal.

For a language such as Mapudungun, however, we propose that the RP structure is not available. NI in this language proceeds by the verb merging with a reduced nominal complement as in (1)b and (14)b. Thus, doubling and stranding is not available in this language.

4.2 Agreement with NI

The issue of agreement is tricky in Iroquoian as 3rd person neuter entities do not trigger agreement. Indeed, as shown above semantically transitive predicates with a 3rd person neuter object behave morpho-syntactically as intransitives. Nevertheless, there are some instances where agreement is triggered with NI, (4) and (5) above. As mentioned above, Baker *et al.* show that NI in Mapudungun is devoid of agreement. The proposed structures here capture this difference. In Onondaga, the verb selects an RP containing both the IN and a full DP (or *pro*). The full DP triggers agreement as shown in the following schematic for (5) (English words used, solid line indicates NI and dashed line indicates object agreement).

(17) $[_{vP}\ v^0\ [_{VP}$ wash $[_{RP}$ body $R^0\ [_{DP}$ Mary/*pro*/her]]]]

Since NI in Mapudungun involves selection of a bare NP (or *n*P), no DP is present to trigger object agreement in the clause.

This analysis requires a brief digression on NI with inalienably possessed nominals. Again, considering the schematic for (4)a, it is not clear how the IN and the DP come to be a constituent.

(18) $[_{vP}\ v^0\ [_{VP}$ wash $[_{RP}$ hand $R^0\ [_{DP}$ Mary/*pro*/her]]]]

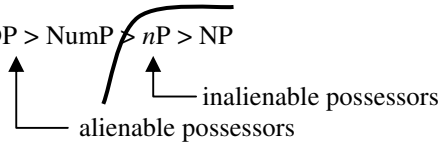
Recall that the IN (here *hand*) is argued to restrict the domain of interpretation of the predicate (see footnote 9). Two questions immediately arise. How does the structure in (18) satisfy the constraints of restriction and saturation since Mary is not a kind of hand? Why is this kind of NI restricted to inalienable possession? To answer the first question, I suggest the following two possibilities. First it is possible that the NI need not compose with the verb via restriction but perhaps as some sort of double functional application.

(19) [[λ y λ x . y wash x] (HAND, MARY)] (I) = 1 iff I washed a hand and I washed Mary.

Thus (19) could be true only in a situation where the speaker washed Mary's hand. In this case, only inalienably possessed items could be found in this construction. If we replace HAND by CAR in (19), the derivation would never result in a truth value of 1 since there is no possible single event of washing Mary and washing a car. There is a single possible of event of washing Mary and washing a hand, though; namely, washing Mary's hand.

Another possibility is that NI with inalienable possession has a different structure altogether, given that the semantic operation of restriction (as laid out by Chung & Ladusaw) cannot handle these structures. Perhaps, then, the verb takes a reduced nominal complement such as *n*P. Since inalienable possessors are low in the extended nominal domain (Alexiadou, 2001, 2002, Tomioka and Sim, 2007) they can appear in NI constructions while alienable possessors cannot, as the following examples shows (dark solid line indicates domain of NI).

(20) DP > NumP > *n*P > NP



If we assume this structure for NI with inalienable possession, this gives us the derivation in (21). Here, the possessor is introduced in Spec*n*P. With a full object DP, the possessor is assigned possessive or genitive Case in SpecDP and the object DP triggers object agreement on the verb (and checks accusative Case on v^0). Here, however, the possessor DP cannot check possessive/genitive Case since there is no DP layer in the object nominal. Furthermore, if we assume that a bare *n*P cannot check accusative Case or trigger agreement, then the only option is for the possessor DP to be assigned accusative Case and trigger agreement on the main verb. The bare nominal then undergoes NI.

(21) $[_{vP}\ v^0\ [_{VP}$ wash $[_{nP}\ [_{DP}$ Mary] [NP hand]]]]

I have outlined here two possible scenarios for accounting for agreement with NI in Iroquoian and the lack of it in Mapudungun. I leave the choice between these two proposals to future research.

4.3 Agreement with NI

Turning now to NI and unaccusatives, recall that NI is available with unaccusatives in Iroquoian but not in Mapudungun (but see footnote 4). We follow Baker *et al.*'s intuition that the EPP is involved here, but differ in the implementation. Recall that for Baker *et al.* it was the lack of φ-features on the

trace of the IN in Mapudungun that fails to satisfy the EPP. For Iroquoian, φ-features are present on the trace of the IN, but are reduced to their default values. This gives rise to the default agreement (shown in **boldface**) Baker *et al.* claim is found in NI with unaccusatives in Mohawk.

(22) t-a'-**ka**-wir-v'-ne' (Baker *et al*., 2005, ex. (53b))
CIS-FACT-**3.SG.NEUT**-baby-fall-PUNC
'The baby fell.'

As suggested in footnote 3, it is possible that neuter agreement holds here because *baby* can often be treated as neuter in some languages. Other examples have been provided that show that full agreement does hold, at least some of the time, requiring an explanation.

Assuming that the EPP is an uninterpretable D feature [*u*D], which is satisfied by a D feature on DP in the sense of Chomsky (1995), then only the RP structure proposed for Iroquoian can undergo NI with unaccusatives. If an unaccusative verb takes a bare NP/*n*P as a complement, then there will be no D feature to satisfy the EPP requirement on T^0. This is shown in the following schemata, where the solid line indicates NI and the dashed line indicates EPP checking.

(23) a. $[_{TP}\ T^0\ [_{VP}\ V^0\ [_{RP}\ IN\ [_{DP}\ DP/\textit{pro}\ ]]]]$ Iroquoian
[~~*u*D~~]

b. $[_{TP}\ T^0\ [_{VP}\ V^0\ [_{\textit{n}P}\ IN]]]$ Mapudungun
[*u*D]

Thus, the unchecked [*u*D] feature in the Mapudungun unaccusative construction causes the derivation to crash, thereby excluding NI from unaccusative constructions. Recall, however, that NI is available in Mapudungun if accompanied by possessor raising. This follows, however, from the analysis assumed here, in much the same way that Baker *et al*. described. As (24) shows, the bare *n*P/N^0 undergoes NI and the DP possessor checks the [*u*D] feature (i.e., EPP) on T^0. What remains unclear, however, is the exact structure of the possessive construction in Mapudungun. The same structures used for Iroquoian above cannot be extended to Mapudungun as both alienable and inalienable possessors can undergo possessor raising in Mapudungun (see Baker *et al*. for further discussion). We leave this problem for future research.

(24) $[_{TP}\ T^0\ [_{VP}$ burn $[[_{\textit{n}/NP}$ house$]\ [_{DP}$ John$]]]]$
[~~*u*D~~]

In summary, we have seen in this section that the differences between NI in Iroquoian and Mapudungun can be explained by the two different types of structures proposed here.

5 Conclusion

We have explored differences in NI between Iroquoian and Mapudungun and have argued that these differences can be boiled down to a difference in the structure of the IN its relationship to the direct object. We have also argued against the φ-deletion approach put forth in Baker *et al.* We have argued instead for the following two types of structures.

(25) a. V^0 [$_{RP}$ IN R^0 [$_{DP}$ dir. obj.]] – found in Iroquoian
b. V^0 [$_{n/NP}$ IN] – found in Mapudungun

While Iroquoian has an RP (Restrictor Phrase) which hosts both the IN and the object DP, Mapudungun has only a bare nominal that undergoes NI. These two structures account for the following differences. First, Iroquoian allows for doubling and stranding with NI, while Mapudungun does not. This is clearly a result of the presence or absence of the DP in the NI structure. Second, Iroquoian exhibits agreement with NI (with some exceptions), while Mapudungun never exhibits agreement with NI. Again, this was argued to be the result of the presence versus absence of the DP, which triggers object agreement. Finally, NI is permitted with unaccusatives in Iroquoian but not in Mapudungun. It was argued that the EPP is satisfied by checking off an uninterpretable [*u*D] feature on T^0. Again, this is available only when there is a DP available.

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