#### **Noun Incorporation as Symmetry Breaking**

#### Abstract

This paper proposes a novel account of noun incorporation in Northern Iroquoian. It is proposed that there is no special mechanism for noun incorporation and that this phenomenon falls out naturally from the geometry of the phrase structure under Moro's theory of Dynamic Antisymmetry. In a nutshell, when the verbal head and the nominal head undergo Merge, they form a point of symmetric c-command, which is resolved by the nominal head moving to the specifier of the verb phrase. Further, it is proposed that in noun incorporation constructions with a full DP double the incorporated noun and the DP form a constituent, which is merged in theta-position.

#### Résumé

Cet article propose une nouvelle occurrence ayant trait à l'incorporation nominale dans le nord-iroquoien. Il propose l'absence d'un mécanisme particulier en matière d'incorporation nominale, et ce phénomène apparaît naturellement en raison de la géométrie de la syntaxe, suivant la théorie de l'Antisymétrie dynamique de Moro. De ce fait, la fusion du radical verbal et nominal forme un point de la c-commande symétrique qui se traduit par la dislocation du radical nominal au spécificateur du syntagme verbale. De plus, il avance que le nom incorporé dans les constructions avec un SD doublé forment un constituent ensemble qui est fusioné par Merge à la position de la rôle-thêta. This paper discusses noun incorporation (hereafter, NI) in Northern Iroquoian and suggests that this phenomenon can be understood as an instance of symmetry breaking under the framework of Dynamic Antisymmetry (Moro 2000). This contrasts with earlier

syntactic approaches whereby the incorporated noun raises to adjoin to the verb for some kind of formal licensing condition, such as the Morphological Visibility Condition (Baker 1996). I suggest the following alternative. When the verb and the bare noun are merged, they c-command each other, forming a point of symmetric c-command, in violation of the Linear Correspondence Axiom (LCA), which then triggers the noun to move to SpecVP. By contrast, when the verb selects a full DP complement, the verb asymmetrically ccommands the material inside the DP, thereby making linearization possible under the LCA. Thus, when the verb merges with a DP, no movement is required for the purposes of linearization; although, in a given language, the object DP may still move for other reasons such as object shift, scrambling, or Case checking. This proposal accounts for the cross-linguistic generalization that noun incorporation is often ordered N+V (Caballero et al. 2008), while non-incorporated constructions are evenly split between V+DP or DP+V (where the + indicates linear precedence, i.e., VO and OV languages are roughly equal in number). This is because the point of symmetry between the noun and the verb will always trigger the noun to move to SpecVP. I show that the proposed analysis accounts for some empirical shortcomings in Baker (1988; 1996) and Baker et al. (2005). Additionally, this analysis provides a coherent explanation for noun incorporation without having to introduce additional theoretical apparatus such as the Morphological Visibility Condition.

<sup>&</sup>lt;sup>1</sup> Of course, not all NI constructions take the form N+V as Caballero et al discuss at length. I address this issue later in the discussion.

Additionally, I discuss a broad range of data in Northern Iroquoian and present data which are problematic for Baker's (1988; 1996) head movement analysis, but which receive a straight-forward explanation under the current proposal. In particular, I discuss data in which the incorporated element is larger than a head. Given the current problems with head movement (discussed below) and the fact that the incorporated noun (hereafter IN) can be larger than a head, we pursue the analysis outlined above rather than a head movement approach. We also present data on the interaction between *wh*-constructions and NI, which clearly show that the direct object and the IN share the same base position. I propose an analysis for the facts concerning these data.

This paper is organized as follows. Section 1 presents the theoretical background in which this analysis is couched. Section 2 considers Bare Phrase Structure in light of Dynamic Antisymmetry and shows how these two theories of phrase structure interact to give rise to NI. Section 3 discusses the properties of NI in Northern Iroquoian, concentrating mostly on Oneida and Onondaga. Section 4 goes through previous analyses of NI in Northern Iroquoian and discusses some problematic issues. Section 5 presents the current analysis; namely, NI as the result of symmetry breaking. Section 6 is a brief conclusion.

### 1. Theoretical Background

Kayne (1994) proposes a restrictive theory of linearization based on asymmetric c-command. Roughly speaking, if an element,  $\alpha$ , asymmetrically c-commands an element,  $\beta$ , then  $\alpha$  precedes  $\beta$ . This theory of word order is captured under the LCA as follows:

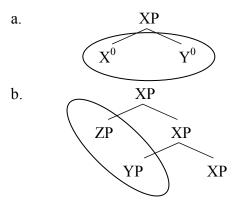
(1) d(A) is a linear ordering of T.

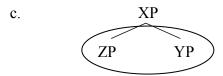
Here, T is the set of terminals in the phrase marker. A is the set of ordered pairs of terms,  $\{(X_1, Y_1), (X_2, Y_2), (X_3, Y_3) \dots (X_n, Y_n)\}$ , in the phrase marker such that the first member of the pair,  $X_i$ , asymmetrically c-commands the second member,  $Y_i$ , where c-command is defined as follows.

(2)  $\alpha$  c-commands  $\beta$  iff every maximal projection that dominates  $\alpha$  dominates  $\beta$  and  $\alpha$  does not contain  $\beta$ , where  $\alpha$  and  $\beta$  are categories. A maximal projection dominates a category iff every segment of the maximal projection contains the category.

Kayne originally sought to derive X-bar Theory with the LCA and, thus, assumed that the LCA held at all levels of grammar (since it was assumed that X-Bar Theory held at all levels of grammar). With the advent of BPS and the abandonment of X-Bar Theory, Moro (2000; 2004), picking up on a suggestion by Chomsky (1995b: 337), argues that the LCA is a PF constraint satisfying bare output conditions required for the articulo-perceptual interface – namely, the need to achieve linear order. This gives rise to the possibility that LCA violations are formed in the syntax (or at LF), as long as they are repaired by PF. Under Moro's Dynamic Antisymmetry approach, symmetric c-command triggers movement to attain asymmetric c-command so that the LCA is satisfied. Moro discusses three specific contexts in which we find symmetric c-command, shown below.

### (3) *Symmetric C-Command*





In these three examples, the elements in the ovals c-command each other. Moro proposes that this symmetry acts as a trigger for movement. In fact, Moro pursues a research program in which symmetry, not morphology (i.e., uninterpretable features and the like), serves as the sole trigger for movement.<sup>2</sup> When two elements are in a configuration of symmetric c-command, one of them must raise to a higher position to break this point of symmetry. Moro illustrates this with equative constructions such as in the following pair.

- (4) a. The winner of the race is the man with the green hat.
  - b. The man with the green hat is the winner of the race.

Under Moro's analysis, the two DPs *the winner of the race* and *the man with the green hat* c-command each other forcing one to raise. In this case, either DP can raise. In other situations, certain properties of the grammar will dictate that one of the two elements must raise. In this paper, we will be concerned only with the type of symmetry illustrated in (3)a; namely, the merger of two heads.

To summarize, the LCA requires that all terminals enter into a total and non-contradictory linear ordering. The LCA is evaluated at the PF interface (following Moro, 2000 but *contra* Kayne, 1994). Points of symmetry between two syntactic objects (i.e., symmetric c-command) trigger movement of one of the syntactic objects. The choice as

<sup>2</sup> See, for example, (Baauw 1998; Guasti and Moro 2001) for developments in this direction. The current paper does not adopt this extreme position as we allow for movement to topic and focus positions.

to which syntactic object moves may be free or may depend on other factors (see Moro, 2004 for discussion).

The last issue we address is that of head movement. It has recently been argued that head-movement either does not exist or is relegated to PF (Chomsky 2000; Fanselow 2003; Harley 2004; Kayne 2003; Koopman and Szabolcsi 2000; Mahajan 2003; Boeckx and Stjepanović 2001). We adopt the arguments put forth in the references cited and assume here that head movement is not available to UG.3 The abandonment of head movement from UG has necessitated re-thinking several standard analyses of syntactic phenomena – in particular, verb movement. There is, of course, a vast literature exploring this line of inquiry, which cannot be summarized here (Aldridge 2003; Ambar and Pollock 2002; Baltin 2001; Haegeman 2001; Kandybowicz and Baker 2003; Lee 2000; Massam 2000; Müller 2004; Takano 2000 inter alia). The current study extends the XPmovement approach to the domain of NI – a process which has been previously treated as involving head movement (Baker 1988, et seq.).4

In the present work, we make the following assumptions. We adopt the theory of BPS as presented in Chomsky (1995a). Furthermore, we assume the single-engine hypothesis in which there is no pre-syntactic lexical or morphological level of grammar

<sup>&</sup>lt;sup>3</sup> Matushansky (2006) argues that head movement is available to UG. Her account, however, is incompatible with the current proposal, which relies on the availability of moving the complement of X<sup>0</sup> to the specifier of the same projection – a type of movement Matushansky's proposal does not admit to UG. See also footnote 6.

<sup>&</sup>lt;sup>4</sup> ...at least as far as syntactic approaches are concerned. There are, of course, many analyses of NI which treat this phenomenon as lexical rather than syntactic. See footnote 10.

(Compton and Pittman 2007; Julien 2002; Marantz 1997; Halle and Marantz 1993). We also assume the basic ideas of Antisymmetry as proposed by Kayne (1994) and of Dynamic Antisymmetry as proposed by Moro (2000) as described above (but discussed further below). We also assume head movement is not part of UG. However, the task of bringing the LCA in line with BPS still remains, which we address in the next section.

## 2. On Unifying Antisymmetry and BPS

As mentioned above, the original formulation of Antisymmetry derived the effects of X-bar theory. The elimination of X-bar theory from UG in favour of BPS (Chomsky, 1994) led the way for certain aspects of Antisymmetry to be re-examined. We have seen above that the LCA is now argued to hold only at PF, not throughout the entire derivation. Let us now consider how the ideas expressed in Kayne (1994) carry over to a BPS framework. Throughout the forthcoming discussion, we will discuss previous work that comes to bear on the same issue.

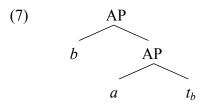
Consider the initial merger of two lexical items at the outset of a syntactic derivation:<sup>5</sup>

The representation in (5) violates the LCA because a and b c-command each other. The reader will note, of course, that a and b are not categories. We amend the definition of c-command to allow both heads and categories to participate in c-command relations.

<sup>&</sup>lt;sup>5</sup> For clarity, lexical items are written in italics and labels are written in capitals. (5) is simply a more reader-friendly representation of {a, {a, b}}.

(6)  $\alpha$  c-commands  $\beta$  if there is no category that dominates  $\alpha$  that does not dominate  $\beta$ , and  $\alpha$  does not contain  $\beta$ .

Following Moro (2000), this point of symmetry is eliminated by moving the complement to specifier position in AP:<sup>6</sup>



At this point, b, strictly speaking, c-commands a, since every category that dominates b (none, in fact) also dominates a. In other words, there is no category that dominates b that does not dominate a. Since a, but not b is dominated by AP, a does not c-command b. Thus, b asymmetrically c-commands a since b is undominated, and b and a can be linearized.

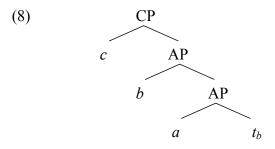
We assume some version of the Copy Theory of movement (Chomsky 1993) whereby Copy Deletion (specifically the choice of which copy to delete) takes place

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It has often been argued that complement-to-Specifier raising within the same projection is ruled out under some version of anti-locality (Abels 2003; Grohmann 2003). A common argument against Complement-to-Spec movement concerns feature checking. Under the assumption that movement takes place to establish some feature checking configuration, it is clear that Complement-to-Spec movement is ruled out since it does nothing to establish any new checking relation. Once we drop the assumption that all movement is feature driven, then Complement-to-Spec movement can be ruled out only by stipulation. Furthermore, we note a large body of research which crucially relies on the existence of this kind of movement (Kahnemuyipour and Massam 2003, 2006; Rackowski and Travis 2000; Travis 2007; Aboh 2004; Koopman and Szabolcsi 2000).

along the lines of Nunes (2004). Thus, traces are used here simply as a shorthand for copies that are deleted at PF. Note that this does not rule out the possibility of pronouncing lower copies altogether; however, lower copies that violate the LCA (such as  $t_b$  in (4) above) cannot be realized at PF.

Now, once another head, c, is merged with AP no asymmetric c-command relation holds between b and c, thus, these two heads cannot be linearized.



In (8), b and c are dominated by the same set of maximal projections, namely CP. b is not dominated by AP since not every segment of AP dominates b. Thus, every category that dominates b also dominates c and every category that dominates c also dominates b. Asymmetric c-command is re-established between c and b the same way as between a and b above. Specifically, AP raises to the specifier of CP, a process commonly referred to as intraposition, roll-up, or snowballing (see the references at the end of footnote 6). This gives us the structure shown in (9) and the linear order of heads shown in (10).

<sup>&</sup>lt;sup>7</sup> One may wonder why it is b that raises to SpecCP, rather than AP. I assume that in the absence of any external force motivating the raising of b, moving AP is preferred due to Shortest Move, as the distance 'complement of c' to SpecCP is shorter than the distance SpecAP to SpecCP in terms of number of nodes.

(9) 
$$CP$$

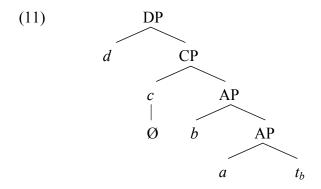
$$b \qquad AP \qquad CP$$

$$a \qquad t_b$$

(10) b < a < c

By this process, however, the complement of every head will invariably move to the specifier of that head for the entire derivation! If another head merges with the derivation CP will have to move to the specifier of this new projection to eliminate symmetric c-command.

Consider, however, a situation in which c does not have any phonological content. In such a case, it is unnecessary for c and b to be linearized, as suggested by Moro (2000). Recall that the LCA is a PF constraint, and PF does not care about linearizing elements that do not have any phonological content. Now, let's consider what happens if c in (8) is phonologically empty. No further movement is necessary. If another (phonologically contentful) head, d, is merged with the phrase marker in (8) giving (11), asymmetric command holds between d and b:



Here, asymmetric c-command holds between d, b and a, giving the surface order d < b < a, as suggested by the phrase marker shown. The remaining head, c, does not participate in linear order since it is phonologically empty.

To conclude, we have seen that the merger of two heads results in a violation of the LCA, which is resolved by moving the non-projecting head to Specifier position. The next section discusses the relevant properties of NI in Northern Iroquoian, which we will see can be accounted for by the principles discussed above.

## 3. Noun Incorporation in Northern Iroquoian

This section discusses several important properties of NI in Northern Iroquoian, including some properties that have hitherto failed to receive a formal syntactic treatment. Indeed, one of the principle goals of this paper is to enlarge the empirical domain in the discussion of NI in Iroquoian. The other principle goal, of course, is to formulate an analysis of this wider range of facts, which is the topic of section 4. For now, however, let us focus on the properties of NI in Northern Iroquoian.

This section is organized as follows. Section 3.1 briefly outlines the clause structure of Northern Iroquoian. Section 3.2 discusses patterns of NI in this language group and covers several core properties of this construction. Section 3.3 discusses previous analyses and addresses their shortcomings.

### 3.1 Northern Iroquoian Clause Structure

In this section, I briefly outline the fundamental characteristics of clause structure in Northern Iroquoian. The chart in (12) shows the morpheme order for the verbal complex (adapted from Lounsbury 1949, 1953)<sup>8</sup> and the corresponding lexical and functional heads I assume correspond with them.

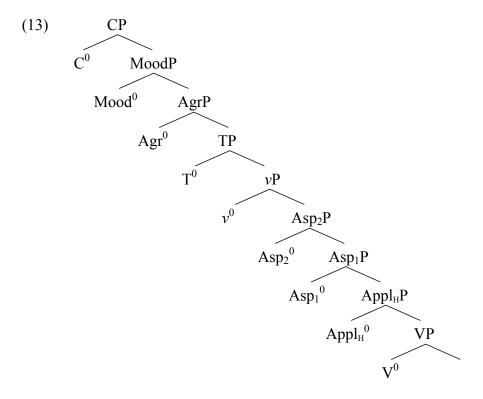
(12) Morpheme Order in the Verbal Complex

mood	pronominal	Incorporated	verbal	applicatives	aspect	expanded
	prefixes	noun	$\sqrt{}$		suffixes	aspect
$Mood^0$	$Agr^0$	nP	$V^0$	$Appl_H^0$	$Asp_1^{\ 0}$	$Asp_2^0$

The mood morphemes include future, factual and optative. The pronominal prefixes are portmanteau morphemes that agree with both subject and object. I set aside the morphosyntax of pronominal prefixes in Northern Iroquoian as it does not bear on the present analysis, and assume a simple AgrP for the purposes of exposition. Next, causatives and benefactives appear under Appl<sub>H</sub><sup>0</sup> (high applicative) following Pylkkänen (2008). Following the Mirror Principle (Baker, 1988) the morpheme order in (12) suggests the phrase structure in (13), setting aside the position of the incorporated noun for now. Note that the structure below includes at TP despite the lack of any traditional tense morphology in Northern Iroquoian languages (though see footnote 17). It is included merely because Northern Iroquoian languages have a temporal-based aspectual system, thus it seems reasonable that there is a functional projection that uses tense as part of the spine of the clause. Nothing in the forthcoming analysis hinges on the presence of absence of TP, however. The analysis would play out the same were this projection absent. Note also the inclusion of  $\nu^0$ , despite the lack of verbalizers (akin to

<sup>&</sup>lt;sup>8</sup> In the traditional Iroquoian literature mood morphemes are grouped under a larger class called prepronominal prefixes, which includes an assortment of other elements (such as *locative* and *repetitive*). The applicative morphemes include benefactive, instrumental and causative.

English -ate, -ify, etc.) We assume that roots are acategorial and require a "small" lexical head of some sort along the lines of Marantz (1997; 2001). I discuss this further below.



Turning now to aspect, we first note Dyck's (1992) observation that, for a closely related language, Cayuga, accusative Case marking is available only when the event is telic. Independently, Kratzer (2004) draws a strong connection between telicity and accusative Case. Furthermore, Travis (1991) notes that some intriguing relationships between aspect and the direct object fall into place if the structure includes an inner aspect phrase (i.e., below  $\nu$ P). In particular, she relates inner aspect to completedness. Accordingly, in earlier work , I capitalized on Kratzer's and Travis' insights and Dyck's observations in Cayuga and proposed an analysis of pronominal

marking in Iroquoian that relates telicity or boundedness<sup>9</sup> to accusative agreement on the verbal complex and mediates this relationship through an inner AspP, as shown in (13).

Turning to how the discourse-configurational aspects of Northern Iroquoian (Baker 1991, 1996) relate to clausal structure, I assume that the overt arguments appear in discourse-related A-bar positions in the left periphery (in the sense of Rizzi 1997). More specifically, I assume an analysis in which the arguments raise to some clause-peripheral position (Legate 2002; Russell and Reinholtz 1996) *contra* the Pronominal Argument Hypothesis (Jelinek 1984). We will revisit this issue briefly in our discussion on *wh*-movement, where some indirect evidence for this position is presented. Regarding overt nominals that appear to the right of the verb, I assume these, too, raise to the left (but not to the extreme left periphery) and that the verbal complex raises above such nominals. Footnote 17 may be relevant here.

This brief section has introduced the clause structure of Northern Iroquoian. The next section describes several important properties of NI in Northern Iroquoian.

#### 3.2 Properties of Noun Incorporation in Northern Iroquoian

This section describes the properties of NI in Northern Iroquoian for which the analysis in section 4 will be presented. We discuss classifier NI (where the IN is doubled by a more specific full DP), modifier standing, NI in intransitives, and NI of verbal roots (which makes use of so-called nominalizers).

<sup>&</sup>lt;sup>9</sup> I remain agnostic here as to whether telicity or boundedness (in the sense of Depraetere 1995) is the more appropriate choice.

NI in Northern Iroquoian languages can typically alternate with a full DP object. This is a remarkably productive process. <sup>10</sup> Consider the following Onondaga data (Woodbury 2003). <sup>11</sup>

- (14) a. wa²gnakdahní:nq²
  wa²- k- nakt- hninq- ²
  FACT- 1.SG- bed- buy- PUNC
  'I bought a/the bed.'
  - b. wa'khní:no' ne' ganakda' wa'- k- hnino- ' ne' ka- nakt- a' FACT- 1.SG- buy- PUNC NE N.PREF- bed- NFS 'I bought a/the bed.'

In (14)b, the direct object is represented by a full DP, while in (14)a, the same argument is represented by a bare nominal root that has undergone NI, becoming prefixed to the verbal root.

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The lack of complete wide-spread productivity of NI has often been used as an argument for NI as a lexical process rather than a syntactic one. Given that we adopt the single-engine hypothesis, in which there is no separate lexical/morphological component, a detailed discussion of the facts surrounding the debate on whether NI is lexical or syntactic is moot. The reader is referred to the literature on this matter (Di Sciullo and Williams 1987; Mithun 1984, 1986; Rosen 1989; Baker 1988, 1993, 1996; Baker et al. 2005; Sadock 1980, 1985, 1986; Wiltschko 2003).

<sup>&</sup>lt;sup>10</sup> There are several idiosyncratic lexical and morphological restrictions on NI, however (Woodbury 1975).

We employ the following abbreviations: ACC = accusative, CIS = cislocative, DEM = demonstrative, DN = dummy noun, DUC = dualic, F = feminine, FACT = factual, FUT = future, HAB = habitual, M = masculine, NE = a nominal element of unclear function, NFS = noun forming suffix, NOM = nominative, N.PREF = nominal prefix, NT = neuter, NZLR = nominalizer, PUNC = punctual, SG = singular, SREFL = semi-reflexive,  $\sqrt{}$  = root. To save space, agreement markers are sometimes represented simply by their English equivalents.

In virtually all languages that permit NI, only the theme internal argument can undergo this process; the goal/source argument cannot (Mithun 1984). <sup>12</sup> Northern Iroquoian is no exception in this regard as Baker (1996: 207) demonstrated with the following Mohawk data (glosses adjusted to current usage).

#### (15) *Noun Incorporation in Mohawk Ditransitives*

- a. t- a'- khey- athvni- tsher- u- ' ne owira'a CIS- FACT- I:her- ball- NZLR- give- PUNC NE baby 'I gave the ball to the baby.'
- b. #t- a'- ke- wir- u- ' ne athvno
  CIS- FACT- 1.SG.NOM- baby- give- PUNC NE ball
  'I gave the baby to the ball.' (NOT 'I gave the ball to the baby.')

In (15), the theme is incorporated in the first sentence. In the second sentence, *wir* ('baby') is incorporated, and the construction can be understood only with *wir* as the theme, not the goal.

The IN can be doubled by a more specific full DP as in (16), a phenomenon described as *classifier incorporation* by Rosen (1989) and Type IV incorporation by Mithun (1984). Descriptively, the IN specifies the kind of object the verb takes. In (16), the IN, *-naskw-* ('animal') specifies the kind of object present, *gwisgwis*, ('pig'). Consider the following Onondaga data (Nora Carrier and Gloria Williams, speakers).

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Other non-core arguments can undergo incorporation as discussed in Mithun and

<sup>&</sup>lt;sup>12</sup> Other non-core arguments can undergo incorporation as discussed in Mithun and elsewhere. These include instruments and paths. We do not discuss these here; however, we assume that instruments and paths are merged directly into a VP-shell (Larson 1988) and are headed by a PP or KP that identifies some inherent Case. When NI occurs, this projection (P or K) fails to appear, along with the rest of the extended nominal projection, leaving only the lexical root. NI can then proceed as described in section 4.

(16) wa'gnasgwohae' ne' gwisgwis
wa'- k- naskw- ohae- ' ne' kwiskwis
FACT- 1.SG- animal- wash- PUNC NE pig
'I washed the pig.'

NI in Northern Iroquoian has been described as having the property of modifier stranding (see Baker 1996 for Mohawk); however, Rosen (1989) points out that modifier stranding is available independently of NI and argues that it sheds no light on the analysis of NI. Nevertheless, we present the facts here and take up the issue again later on. Consider the following Onondaga data (Nora Carrier and Gloria Williams, speakers).

- (17) a. wa'khní:no' ne' nęge' ganakda'
  wa'- k- hnino- ' ne' nęke' kanakta'
  FACT- 1.SG.NOM buy- PUNC NE DEM bed
  'I bought this bed.'
  - b. wa'gnakdahní:no' ne' nege'
    wa'- k- nakt- hnino- ' ne' neke'
    FACT- 1.SG.NOM bed- buy- PUNC NE DEM
    'I bought this bed.'
  - c. wa'khni:no' ne' nege'
    wa'-k-hni:no-: ne' neke'
    FACT-1.SG.NOM-buy-PUNC NE DEM
    'I bought this (one).'

The data in (17)a, b illustrate the phenomenon of modifier stranding. Baker (1996) argues that the nominal head in (17)a, which forms part of a full noun phrase there, can undergo NI as in (17)b, thereby stranding the demonstrative. As Rosen (1989) points out, however,

bare demonstratives are available in Northern Iroquoian, thus obviating the need for any special analysis of modifier stranding.<sup>13</sup>

Many instances of NI require the incorporated element to appear with a nominalizer in NI constructions. Consider the following Oneida (Michelson and Doxtator 2002) and Onondaga (Woodbury 2003) data, respectively.

(18) a. wa?utokwa?tslóhale?

wa?- u- atokw- ?tsl- ohale- ?
FACT- 3.SG.F.NOM- take.out.of.water- NZLR- wash- PERF
'She washed the spoon.'

b. agadęna<sup>9</sup>tshähninóh

ak- atena?t- shR- hnino-'h 1.SG.ACC- groceries- NZLR- buy- STAT 'I have bought groceries.'

In the traditional literature, many of these incorporated elements are taken to be verbal bases which must be nominalized to be able to participate in NI. What is clear, however, is that the incorporated element is larger than a single head.<sup>14</sup>

#### 3.3 Previous Analyses

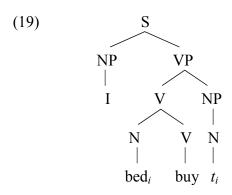
Now we discuss Baker's (1988, 1996) and Baker *et al.*'s (2005) account of NI in Mohawk along with some of its shortcomings. Since Baker's and Baker *et al.*'s accounts still represent the general view on syntactic NI within a generative framework, we will concern ourselves only with their analysis here.

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<sup>&</sup>lt;sup>13</sup> Baker and Rosen discussed Mohawk data in relation to modifier stranding; however, as shown above, the same facts hold in Onondaga. In addition to demonstratives, Northern Iroquoian languages can also strand relative clauses and adjectives.

<sup>&</sup>lt;sup>14</sup> See also Mathieu (2008), who argues quite convincingly for phrasal noun incorporation in Ojibwe.

In Baker's and Baker *et al.*'s analysis of NI in Mohawk (Baker 1996: 281), they propose that the head of a bare NP raises and incorporates into the verb.



In (19), English words have been used in place of the Mohawk, as in Baker's original example. Baker argues that NI takes place because the verb in Mohawk must discharge its  $\theta$ -role to an element internal to the verb.<sup>15</sup>

One particularly acute problem with this proposal concerns the interaction of NI and wh-movement. Recall that Baker adopts the Pronominal Argument Hypothesis (Jelinek 1984) in which overt nominals are merged in an adjoined position and binds a pro in argument position. Baker (1996: 66ff) shows quite clearly that wh-phrases in Mohawk do not appear in adjoined positions but rather undergo A-bar movement from an argument position to a position in the left-periphery (assumedly, SpecCP). Thus, NI should be incompatible with wh-movement since both the IN and the wh-phrase would have to originate in the same position. Indeed, Baker (1996: 325, ex (91)) offers data that suggest NI and wh-movement cannot co-occur. Consider, however, the following Onondaga data (Gloria Williams, Nora Carrier, speakers).

<sup>&</sup>lt;sup>15</sup> This is the essence of Baker's (1996) Morphological Visibility Condition – that in a polysynthetic language all θ-roles must be discharged to a morpheme internal to the word that assigns the θ-roles.

- (20) a. gaęnigáe' gwísgwis wa'snasgwahní:nọ' kaęnikáe' kwiskwis wa'- s- naskw- hninọ- ' which pig FACT- 2.SG- animal- buy- PUNC 'Which pig did you buy?'
  - b. nwade' wa'shahyahni:no' nwate' wa'- s- ahy- hnino-' what FACT- 2.SG- animal- buy- PUNC 'What kind of fruit did you buy?'

Baker does explain that D-linked questions are compatible with NI; however, none of his examples contains a full nominal expression with the *wh*-word (as in (20)a), rather, the *wh*-word is bare. Consider the following Mohawk example (Baker, 1996: 323, ex (85c)).

In Baker's analysis, the *wh*-word is an adjunct to the NP which undergoes *wh*-movement to SpecCP and the head noun, *wir* ('baby'), undergoes NI. This analysis won't work for (20)a since there is already a full nominal expression along with the IN. Finally, we note that Baker reports examples such as (20)b as ungrammatical for Mohawk; however, neither of my Onondaga consultants had any difficulty with this sentence or others like it. Interestingly, though, such sentences always have the "kind of" reading. Clearly, the availability of both NI and *wh*-movement is something that a theory of NI must explain.

In sum, we have seen two problematic areas for the analysis of NI proposed in Baker (1988) *et seq*. First, it is unclear how nominalizers can be accommodated under Baker's approach. Second, and more seriously, the interaction between NI and *wh*-movement is problematic for the syntactic analysis of NI proposed by Baker. Having

outlined various problems with Baker's approach to NI, I now turn to the current proposal, in which NI arises as the result of symmetric c-command.

## 4. Analysis: Noun Incorporation as Symmetry Breaking

This section presents the analysis of the properties of NI discussed in the previous section, taking into account the problems noted for Baker's analysis of NI. First we discuss straightforward incorporation of bare roots with and without a nominalizer. Then we go on to discuss how the analysis presented here is able to accommodate the other properties of NI discussed in section 3.2.

## 4.1 Noun Incorporation with Nominal and Verbal Roots

Consider first the Oneida sentence in (22), (Michelson and Doxtator 2002). In this example, the incorporated root, *-atokw-*, means 'take out of water' and prototypically occurs in verbal constructions. <sup>16</sup> It must appear with a nominalizer in NI constructions.

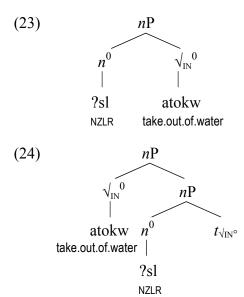
#### (22) wa?utokwa?tslóhale?

wa?- u- atokw- ?tsl- ohale- ?
FACT- 3.SG.F.NOM- take.out.of.water- NZLR- wash- PUNC 'She washed the spoon.'

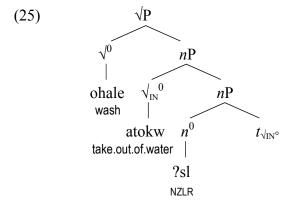
Assume, following Marantz (2001) *inter alia*, that the nominalizer is a categorizing head,  $n^0$ . When the nominalizer and the bare root (labelled  $\sqrt{10}$  to distinguish it from the lexical verb, labelled  $\sqrt{10}$ ) undergo Merge, they are in a symmetric c-command relation as shown in (23), which is eliminated by moving  $\sqrt{10}$  to SpecnP as shown in (24).

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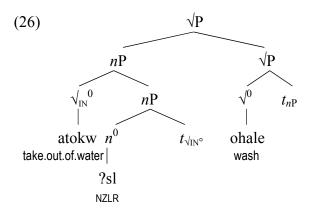
<sup>&</sup>lt;sup>16</sup> We use the terms 'verbal root' and 'nominal root' as mnemonic devices only to facilitate the discussion. Throughout the analysis it is assumed, à la Marantz, that roots do not carry categorial information.



Let us assume that the verb ( $\sqrt{0}$ ) takes the bare nP as a complement rather than a full DP. This is shown in (25).



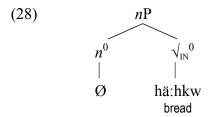
Now,  $\sqrt{0}$  and  $\sqrt{1}_{IN}^0$  are in symmetric c-command relation, since  $\sqrt{1}_{IN}^0$  is not dominated by nP. nP therefore moves to Spec $\sqrt{P}$  to eliminate this point of symmetry.



In (26), nP asymmetrically c-commands  $\sqrt{0}$ , thus  $\sqrt{1}_{IN}^0$  and  $n^0$  are ordered before  $\sqrt{0}$  by the LCA. Furthermore,  $\sqrt{1}_{IN}^0$  asymmetrically c-commands  $n^0$ , so  $\sqrt{1}_{IN}^0$  is ordered before  $n^0$ .

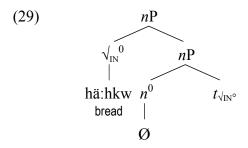
Now, let us consider the incorporation of nominal roots (i.e., roots that appear without a nominalizer, in NI constructions and can usually appear as part of a regular nominal expression). Consider the following Onondaga example (Woodbury 2003).

Again, the derivation starts out with the verb taking a bare nP as a complement.

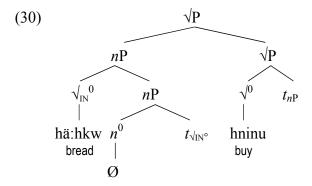


Following our discussion above, we might conclude that there is no LCA violation in (28). However, as we saw above, some allomorphs of the nominalizer do have phonological content. Since the actual allomorph is not inserted until PF, the system at this point does not know whether or not a phonologically contentful allomorph will ultimately appear in

 $n^0$ . All the system knows is that this is an insertion site for a nominalizer morpheme, which may or may not have a phonological matrix which needs to be linearized at PF, hence it triggers movement for LCA violations. Thus, (28) triggers Complement-to-Spec movement as follows.



The derivation continues in the same way as NI with the deverbal noun above, ultimately giving rise to the following structure.



Up to this point I have discussed only the structure within the VP (the  $\sqrt{P}$ , to be precise) with respect to NI. Let us now move further up the tree to the aspectual domain. Recall from section 2 that aspectual morphology appears to the right of the verbal root, suggesting that the  $\sqrt{P}$ , including an incorporated nominal if present, must raise to the left of Asp<sup>0</sup>, rolling up into SpecAspP. Again, this movement takes place as a result of an LCA violation. When Asp<sup>0</sup> merges with the  $\sqrt{P}$ , Asp<sup>0</sup> and  $\sqrt{N}$  will c-command each other and will fail to be linearized. It is the relation of symmetric c-command between these

two elements which forces  $\sqrt{P}$  to move to SpecAspP.<sup>17</sup> This is shown in (32) after we discuss the remainder of the derivation in the following paragraph.

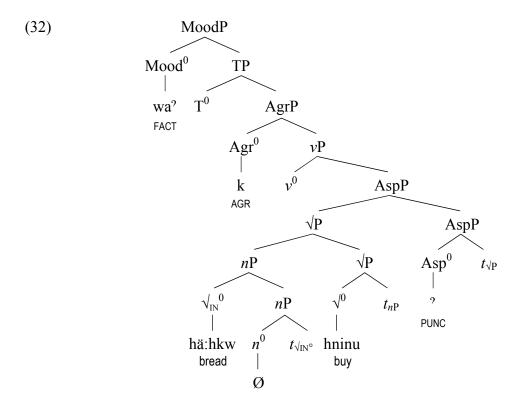
Turning to mood and agreement morphology, we observe that these appear to the left of the verbal root and the incorporated noun, suggesting that the verbal complex does not raise beyond SpecAspP. This is expected, since  $v^0$  is never realized phonologically and thus fails to trigger Complement-to-Spec roll-up once the verbal complex has raised as far as SpecAspP. The resulting structure for the Onondaga sentence in (27), repeated here, is is given in (32).

(31) wa<sup>9</sup>khä:hgwahní:nu<sup>9</sup>

wa'- k- hä:hkw- hninu- ' FACT- 1.SG.NOM- bread- buy- PUNC

'I bought bread.'

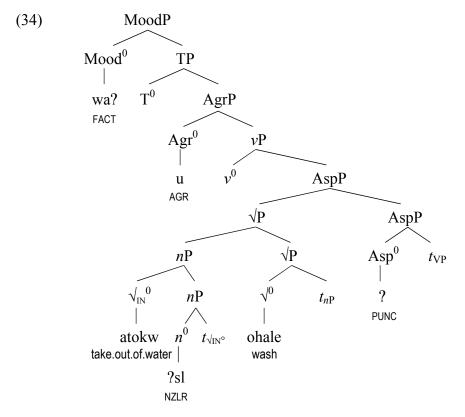
<sup>&</sup>lt;sup>17</sup> Although I have not considered the expanded aspect suffixes here, I assume they head a second Asp<sub>2</sub>P above AspP and trigger an additional round of roll-up. Sometimes the expanded aspect suffixes are analyzed as tense morphemes (Abbott 2000). In this case, the AspP (or νP) would undergo roll-up movement to SpecTP. However, this would not be motivated by the LCA but by some other general verb raising mechanism. If the verbal complex does raise to SpecTP, this would allow elements on the right of the verbal complex to occupy the specifiers of lower functional projections (such as SpecνP for the direct object).



Note that there is no asymmetric c-command relation between  $-h\ddot{a}:hkw$ -, and  $v^0$ , since the same set of maximal projections dominates both heads, namely, MoodP, TP, AgrP and vP.  $\sqrt{N^0}$  is not dominated by  $\sqrt{N^0}$  or AspP, since there is at least one segment of each of these projections that does not dominate  $\sqrt{N^0}$ . This does not matter, however, since  $v^0$  has no phonological content. Agr $^0$  does asymmetrically c-command  $\sqrt{N^0}$  in (32), however, so the LCA is satisfied.

Example (34) shows the complete derivation for the incorporation of a deverbal root that appears in the Oneida sentence from (22), repeated below.

# (33) wa?utokwa?tslóhale? wa?- u- atokw- ?tsl- ohale- ? FACT- 3.SG.F.NOM- take.out.of.water- NZLR- wash- PUNC 'She washed the spoon.'



As above there is no asymmetric c-command relation between  $\sqrt{1}_{IN}^0$ , -atokw-, and  $v^0$ , since the same set of maximal projections dominates both heads, namely, MoodP, TP, AgrP and  $vP - \sqrt{1}_{IN}^0$  is not dominated by nP, VP or AspP, since there is at least one segment of each of these projections that does not dominate  $\sqrt{1}_{IN}^0$ . Again, this does not matter, however, since  $v^0$  has no phonological content. Crucially, however, Agr<sup>0</sup> does asymmetrically c-command  $\sqrt{1}_{IN}^0$  in (34), so the LCA is satisfied.

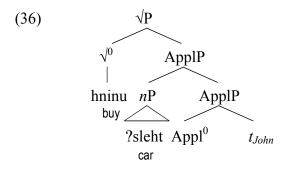
# 4.2 Noun Incorporation in Transfer of Possession Verbs

Next, I take up NI in transfer of possession verbs (Michelson 1991). As discussed in section 3 NI is available only to themes, and not to goals or source arguments (Mithun 1984 inter alia, but see footnote 18). We discuss NI in these constructions and derive the

inability for goals and source arguments to undergo this phenomenon. Consider the following Oneida sentence (Daisy Elijah, speaker).

(35) wahi?slehtahni:nú: John
wa- li- ?sleht- hninu- ': John
FACT- 1.SG.NOM3.SG.M.ACC- car- buy- PUNC John
'I bought John's car.' OR 'I bought a car from John.'

We adopt Michelson's (1991) proposal that verbs of transfer of possession are essentially triadic and assume further, following Pylkkänen (2008), that the two internal arguments are mediated by a low applicative phrase below  $\sqrt{P}$  (below VP in Pylkkänen's terms). This gives us the following structure for the  $\sqrt{P}$ .

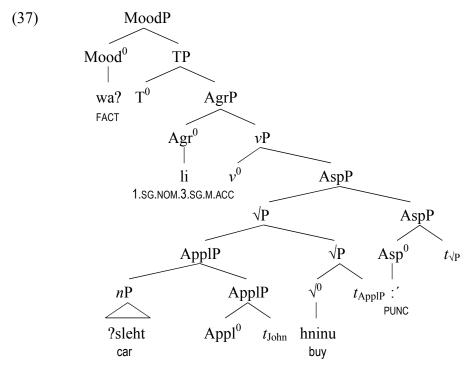


The configuration of arguments in the ApplP demands some explanation. Pylkkänen places the applied argument in SpecApplP under standard assumptions, namely, in the name of Spec-Head agreement. However, the Spec-Head relation has recently been called into question as an unmotivated hold-over from the GB era (Chomsky 2005).

<sup>&</sup>lt;sup>18</sup> I have brushed aside some important issues related to Pylkkänen's proposal. Pylkkänen places the applied argument in SpecApplP also to capture the c-command facts between the applied argument and the direct object (in the sense of Larson 1988), although the semantic relationship between these two arguments suggests the structure in (36). I leave the syntactic and semantic ramifications of the proposed structure to future research.

Hallman (2004) proposes that selection and feature checking take place in a symmetric c-command relation, rather than in a Spec-Head relation. Under this view, the structure in (36) can be understood as follows. The applicative head,  $Appl^0$ , selects the applied argument (which later raises to the left periphery) in a symmetric c-command relation, that is as a complement to  $Appl^0$ . The verb selects the theme argument as a direct object, which appears in SpecApplP, thereby satisfying the symmetric c-command constraint on selection. Thus, the very structure that is required for selection in turn triggers displacement. The configuration in (33) does not satisfy the LCA since the verb, -hninu-('buy'), and the noun, -2sleht- ('car'), c-command each other. As above, Complement-to-Spec roll-up is triggered and ApplP raises to Spec $\sqrt{P}$ . I have represented the source argument, John, as a trace as I assume that overt DPs raise to a topic or focus position in the overt syntax. The  $\sqrt{P}$  complex thus formed is merged with an aspectual morpheme, which triggers raising of the  $\sqrt{P}$  to SpecAspP. The final derivation is shown below (DP, John, not shown).

<sup>&</sup>lt;sup>19</sup> A reviewer asks why the IN cannot simply raise to the left periphery to break symmetry like full DP arguments can. Recall that points of symmetry must be resolved as soon as they are created; thus, the derivation cannot wait until these left periphery positions become available.



Under this approach, the verbal root ( $\sqrt{0}$ ) will never be in a symmetric c-command relation with the goal (or source) since there will always be a null Appl<sup>0</sup> head intervening, thereby preventing an LCA violation from taking hold. This is similar to Baker's (1996) solution to the same problem. He assumed a null preposition intervened between the verb and the goal nominal for roughly similar reasons as described here. There is nothing in Baker's analysis, however, that would prevent the nominal head from undergoing head movement to the null P<sup>0</sup> forming a complex head that then undergoes another round of head movement to the verbal head. I turn now to the issue of doubling and modifier stranding.

## 4.3 Noun Incorporation, Doubling and Modifier Stranding

This section considers NI constructions with DP doubles and stranded modifiers. These phenomena are problematic for syntactic analyses of NI since it is unclear how the IN and

the full DP double or stranded modifier can have the same base position. Let's consider the problem with the sentence in (16) above, repeated here.

(38) wa'gnasgwohae' ne' gwisgwis
wa'- k- naskw- ohae- ' ne' kwiskwis
FACT- 1.SG- animal- wash- PUNC NE pig
'I washed the pig.'

The problem is that the IN -naskw- ('animal') and the DP ne<sup>2</sup> gwisgwis ('the pig'), according to the analysis put forth here, both originate in direct object position. The analysis we propose is that they actually are both merged in the same location as a single constituent, where the IN is in the specifier of a higher functional projection that dominates DP.

Thus, we can maintain the idea that DPs are merged in argument position, while still retaining a syntactic account of noun incorporation. <sup>20</sup> This proposal also solves the problem with NI and *wh*-movement noted in the previous section. The crucial piece of data, a D-linked *wh*-phrase with a coreferential IN, is repeated here.

(40) gaęnigáe² gwísgwis wa²snasgwahní:no²
kaęnikáe² kwiskwis wa²- s- naskw- hnino-²
which pig FACT- 2.SG- animal- buy- PUNC
'Which pig did you buy?'

<sup>&</sup>lt;sup>20</sup> The structure in (39) is not without precedent. Similar constructions have been proposed for clitic doubling (Uriagereka 1995), resumptive pronouns (Boeckx 2003), and Condition B type pronouns (Kayne 2002).

Both the wh-phrase and the IN appear to have the same base position – a problem which is easily overcome by the structure in (39).

Let us propose that the relationship between the IN and the full DP double is mediated by some functional projection (which we label simply as XP) and appear in the specifier and complement of  $X^0$ , respectively. The IN then composes with the verb via Restrict (Chung and Ladusaw 2004), an idea that is adumbrated in Woodbury's (1975) discussion on the same facts. Note that the IN cannot simply be the head of such a projection since, as we saw above, the IN may be internally complex. As a reviewer points out, there are lexical restrictions on the IN and DP doubles. For instance, in Mohawk atahkwani ('clothing') can incorporate, but cannot be doubled (Baker 1996: p. 334, note 25). These kinds of lexical restrictions can be handled by such a functional projection. Specifically under such a proposal,  $X^0$  selects for only certain nPs, and atahkwani in Mohawk is not selected for by this head.

There is additional evidence that the classifier nominal is a specifier, rather than a head, because a full DP can be found in its place in certain environments. The following example (Daisy Elijah, speaker) shows a conjoined DP, *pig and apple* where the classifier for pig (*-neskw-*) is incorporated, and the classifier for apple, *kahik*, is a full DP.<sup>21</sup>

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<sup>&</sup>lt;sup>21</sup> Given that the classifier occupies the specifier of a functional projection higher than DP, one would expect the full DP classifier, *kahik* ('fruit') to appear to the left of the double, *swahiyo:wane?* ('apple'). I leave the proper analysis of the construction in (41) to future research; however, I do offer the following suggestion. Since the classifier is a full DP, rather than merely a nominal root, it is possible that there may be an additional Case checker that somehow triggers some kind of DP-

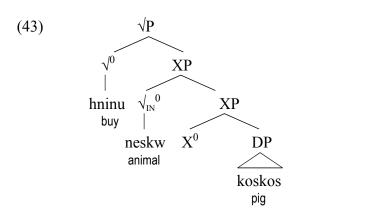
(41) wa?kneskwahni:nú: kóskos o?khále swahiyo:wʌne? kahik

wa?- k- neskw- hninu- : FACT- 1.SG.NOM- animal- buy- PUNC

kóskos o?khále swahiyo:wʌne? ka- ahi- k pig and apple N.PREF- fruit- NFS

Let us now consider the derivation of noun incorporation that is doubled by a full DP. Let us assume that the head of XP mediates the relationship between the IN (in SpecXP) and full DP (which  $X^0$  takes as a complement). With this much in mind, let us consider the derivation for the following Oneida sentence (Daisy Elijah, speaker).

(42) wa?- k- neskw- hninu- ': kóskos FACT- 1.SG.NOM- animal- buy- PUNC pig 'I bought a pig.'

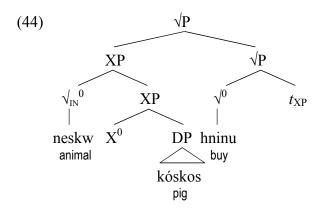


In (43), the classifier/restrictor, *-neskw-* appears as a head in SpecXP. When the verb merges with the XP with the classifier in its specifier, the verb and the classifier are in a relation of symmetric c-command. As above, the XP raises to SpecVP to resolve the

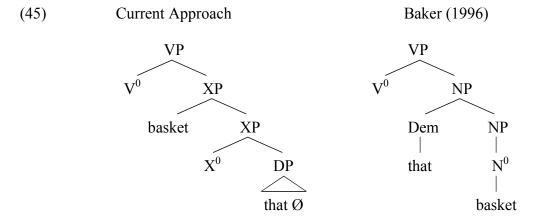
internal movement. Alternatively, there may be some DP-internal Focus or Topic position to which the double moves.

<sup>&#</sup>x27;I bought a pig and an apple.'

point of symmetry, as shown in (44). Recall, also, that overt DPs raise to a position in the left periphery.



At this point it is instructive to contrast the current approach to modifier stranding with that of Baker (1996). For Baker, modifier stranding is the result of the IN undergoing head movement out of the object NP. In the current approach, modifier stranding is epiphenomenal in that is arises from a direct object comprise solely of a bare demonstrative, a construction that is found in the language in non-NI constructions.



This issue has been addressed extensively in the literature. Rosen (1989) (citing Mithun 1984) points out that stranded demonstratives and modifiers are available with or without incorporation in Mohawk (glosses adjusted to labels used in current document).

- (46) a. Kanekwarúnyu wa?- k- akya?tsher- ú:ni 3N.dotted.DIST FACT- 1.SG.NOM- dress- make 'I make a polka-dotted dress.'
  - b. Kanekwarúnyu wa?- k- atkáhtho 3N.dotted.DIST FACT- 1.SG.NOM- see 'I saw a dotted (one).'

In (46)a., Rosen argues, Baker would have to analyze the stranded modifier as the result of the bare noun undergoing incorporation. In (46)b, however, the stranded modifier is the result of *pro*-drop, which is widely attested in Iroquoian. Rosen suggests that Baker's analysis of these facts is not parsimonious since it requires two independent mechanisms for basically the same phenomenon. The current approach resolves this problem since the stranded demonstrative in either case is the result of *pro*-drop. The IN in (46)a. originates in the specifier of XP.

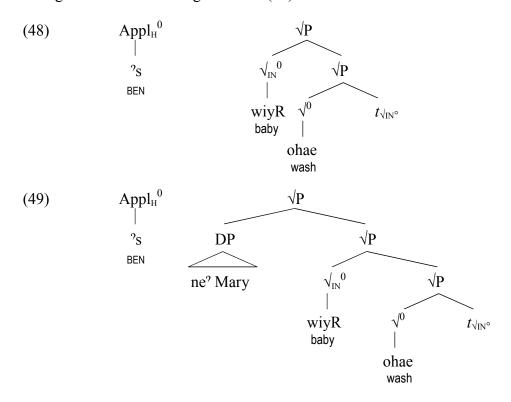
#### 4.4 Noun Incorporation with Benfactives and Causatives

In this section, we consider the derivation of benefactives and causatives. Both of these constructions introduce an additional argument and can appear with NI. Unlike the low applicatives discussed above, these constructions appear with overt morphology. Consider the following Onondaga sentence (Nora Carrier, Gloria Williams, speakers).

(47) wa'khewiyähaes' ne' Meri wa'- khe- wiyR- ohae- 's- Ø ne' Meri FACT- I:her- baby- wash- BEN- PUNC NE Mary 'I washed the baby for Mary.'

In (47), BEN introduces an additional argument, *Mary*, and appears to the right of the N+V complex, but to the left of aspectual morphology. The same set of facts holds for causatives.

Again, these facts fall into place assuming arguments are introduced under symmetric c-command rather than under a spec-head configuration (Hallman 2004), and that benefactives are high applicatives in the sense of Pylkkänen (2008). Let us consider the derivation of (47). As above, the verbal root merges with the nominal root, creating a point of symmetric c-command, which is resolved by roll-up. We now have the situation in (48), where the Appl<sub>H</sub><sup>0</sup> is about to merge with the  $\sqrt{P}$  formed thus far. Before this takes place, however, the applied argument is merged in an additional specifier of  $\sqrt{P}$ , so that the applied argument and Appl<sub>H</sub><sup>0</sup> are in a symmetric c-command relation upon merger. This gives rise to the configuration in (49).



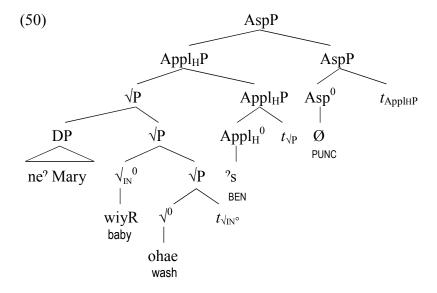
In this configuration,  $\sqrt{_{IN}}^0$  and DP form another point of symmetry. Unlike the previous points of symmetry, however, there is no immediate movement that can take place to resolve it, so the derivation waits until an opportunity arises. <sup>23</sup>

At this point,  $Appl_H^0$  merges with the  $\sqrt{P}$  complex and enters into a point of symmetry both with DP (as required following Hallman 2004) and with  $\sqrt{IN}^0$ . As should now be quite familiar to the reader, the  $\sqrt{P}$  moves to  $SpecAppl_HP$  to remove this point of symmetry. As above, the  $Asp^0$  merges with the complex  $\sqrt{P}$  formed thus far, again giving rise to a point of symmetry with both DP and  $\sqrt{IN}^0$ , triggering the  $\sqrt{P}$  to move to SpecAspP. The remainder of the derivation takes place as previously described and the DP  $ne^P$  Mary moves to a position in the left periphery.

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Technically,  $\sqrt{_{IN}}^0$  asymmetrically c-commands the elements inside DP, thus no point of symmetry is formed. This does not matter, however, since  $Appl_H^0$  will form a point of symmetry triggering movement when it is merged as described above. At which point the derivation need not "wait" as discussed. Typically, multiple specifiers are always treated as points of symmetry, following Moro. See Guimarães (2008) for a discussion of such atypical LCA compliant structures, however.

A look-ahead question arises at this point. It seems as though the applied argument must somehow know the applicative head is about to merge with the derivation, so it needs to get in place to make sure things happen correctly. Under Hallman's proposal the applicative head merges with the  $\sqrt{P}$  first, then the applied argument merges counter-cyclically in Spec $\sqrt{P}$ ; thus, no look-ahead problem arises. Another alternative is that once the applicative head is introduced into the workspace it provides the necessary impetus for the formation of the structure in (49). The derivation then proceeds as described above.



## 4.5 Some Cross-linguistic Loose Ends

In footnote 1 it was mentioned that not all languages exhibit N+V order. For instance, Mapudungun (Harmelink 1992) has V+N order, which Baker *et al.* (2005) attribute to right head adjunction, rather than to left head adjunction. Under the current analysis, V+N order must be the result of some phonologically null head that dominates the IN  $\sqrt{0}$ . Clearly this is not the place to present a full analysis of NI in Mapudungun; however, I would like to suggest the following. Like Northern Iroquoian, Mapudungun must incorporate a categorized root (i.e., an nP). Unlike Northern Iroquoian, however, the nominalizer in Mapudungun is phonologically null  $n^0$  and has no overt allomorphs. Since  $n^0$  is not a vocabulary insertion site, it is invisible to the LCA. Thus, the nominalizer would ensure that asymmetric c-command holds between V and the IN. Of course to be falsifiable, this covert nominalizer would require independent motivation, but this paper is not the place to explore such a proposal.

A reviewer asks why NI isn't more widely available if it reduces to a matter of the geometry of the phrase structure (rather than to some other property, such as Baker's Morphological Visibility Parameter). In particular, why don't we get \*John will always wine-drink rather than John will always drink wine? First, there is good evidence that the mass noun in this example is not simply a bare noun (contra Chierchia 1998; Borer 2005). Consider the following minimal triplet.

- (51) a. John enjoys washing glass. (mass reading only)
  - b. John enjoys washing glasses. (count reading only)
  - c. John enjoys glass-washing. (either mass or count reading)

Ghomeshi (2003) argues convincingly that the count/mass distinction is encoded in NumP. The available readings on the sentences above suggest that NumP is present in (51)a, b but not in (51)c. Thus, the nominal in (51)a can still be analyzed as determinerless, as Chierchia argues, but is not completely bare.

This brings us to the question of the distribution of NI. First, (51)c shows us that some productive NI-like process occurs in English, although like all such constructions in English, the verb that hosts the IN must be nominalized. I follow Harley (2009), who suggests that the presence or absence of NI reduces to whether  $v^0$  allows more than one lexical root. Thus, I do not follow Baker (1996), who assumes a single macro-parameter is responsible for NI. (See also Kaiser 1996; MacSwan 1998; Spencer 1999; Legate 2002 for various arguments against a single macro-parameter for polysynthetic languages.)

Finally, we need to ask why NI is not available with subjects (aside from unaccusatives). The answer, I believe, lies with the EPP. While there is no requirement

on the part of the object to be a full DP, there is such a requirement on the subject so as to satisfy the EPP requirement imposed by SpecTP. Thus, a bare IN subject would violate the EPP. It should be possible, then, to have an NI doubling construction as discussed in section 4.3. Such as construction has a full DP to satisfy EPP plus an IN. Here, I appeal to the properties of the mode of composition, Restrict, in conjunction with Kratzer's (1996) proposal that the external argument is not an argument of the verb, but rather of a Voice head. Restrict interacts with verbal predicates to give rise to a new, unsaturated verbal predicate with a modified meaning. Specifically, it combines the meanings of two lexical roots in such a way so as to restrict the range of possible internal arguments. As a relation between two lexical roots, it follows that Restrict cannot operate on  $v^0$  (and hence the external argument) since this is a functional rather than a lexical element.

## 4.6 Summary

In this section, I have argued for an analysis of NI in Northern Iroquoian couched within the frameworks of Dynamic Antisymmetry and BPS. Specifically, I proposed that NI in Northern Iroquoian has the effect of eliminating symmetric c-command between the verb and its internal argument. Incorporation of a deverbal noun requires an overt nominalizer, or  $n^0$ . When the nominalizer merges with the deverbal noun, the noun raises to SpecnP to satisfy the LCA, and when the nP complex merges with the verb, the nP raises to SpecnP (the VP in more general terms), in the Complement-to-Spec roll-up manner described. In both cases, Complement-to-Spec movement of the IN is eventually halted by the null n0. At the end of this section, I discussed some general properties of NI in Iroquoian, including the fact that the theme, but not the goal/source argument of a

ditransitive can undergo incorporation, and that NI can be doubled by an overt DP or strand modifiers. Both of these properties were shown to fall out from the theory of phrase structure proposed here. I also showed that NI in high applicatives (benefactives and causatives) follows from the analysis proposed here. Finally, some comments on some cross-linguistic issues were made, pointing out directions for future research.

## 5. Conclusion

This paper had two major goals: one empirical and one theoretical. From an empirical perspective, we have offered an analysis of a broad range of properties of NI in Northern Iroquoian within the framework of Dynamic Antisymmetry. From a theoretical perspective, I have outlined a resolution to certain compatibility issues between Dynamic Antisymmetry and BPS – namely the initial merger of two heads.

Summarizing the empirical contributions of the paper, we note that several properties of NI in Northern Iroquoian were shown to fall out naturally given the phrase structural properties of these constructions. Specifically, when a verb merges with a bare noun, these two heads are in a configuration of symmetric c-command, which is resolved by the noun moving to SpecVP. Thus, no special mechanism is required to license noun incorporation. Furthermore, this proposal accounts for the relatively frequent N+V order of incorporated constructions, while the order between V and DP is roughly distributed evenly across languages. The particular properties of noun incorporation in Northern Iroquoian, including the possibility for the theme but not the goal/source to undergo incorporation, doubling of the incorporated noun, modifier stranding, and the interaction between NI and high applicatives (benefactives and causatives) were all shown to be

compatible with the proposed analysis. For doubled constructions, a structure was proposed in which the IN and the DP double are merged as a constituent.

Finally, turning to the theoretical contribution, I have argued that the point of symmetry formed by the initial merger of two heads is resolved by movement of the non-projecting head to the specifier position of the projecting head. I have pointed out various look-ahead problems with Guimarães' Self-Merge proposal, which produces unary branching structures and have suggested that this Dynamic Antisymmetric approach to BPS is essentially responsible for incorporation constructions generally.

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