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Noun incorporation and phrasal movement

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Abstract While we agree with Baker (2009) that noun incorporation (NI) is not a unified phenomenon cross-linguistically, we argue against his claim that head movement is still needed for NI in a number of languages (including Mohawk and Mapudungun). Our proposal is that NI involves phrasal movement. The motivation behind our proposal is that incorporated nominals can be much larger than bare roots with a structure incompatible with head movement. The empirical foundation for the phrasal movement claim comes primarily from Onondaga (*qua* Northern Iroquoian) and Ojibwe (*qua* Algonquian). In these languages, incorporated nouns appear with nominalizers and inflectional morphemes violating Baker's (1996, 2003) Proper Head Movement Generalization. Our proposal about NI has important theoretical ramifications: while it has been popular to build words in polysynthetic languages in the syntax via head movement, we view "wordhood" and the polysynthetic properties of such languages as a phonological phenomenon (Déchaine 1999; Branigan et al. 2005; Compton and Pittman 2010).

Keywords Noun incorporation · XP movement · Head movement · Proper head movement · Nominalizers · Roots · Denominalization · Polysynthesis · Word formation · Phases

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1 Introduction: How does noun incorporation arise?

The study of noun incorporation (NI) has a rich tradition in Native American studies and theoretical linguistics (see Gerdts 1998; Mithun 2000; Massam 2009; Sadock 2006). It has provoked much debate in the literature and questions surrounding the construction abound: Is it syntactic? Is it the product of the lexicon? What are its semantic properties? Why does it appear to be available in some languages but not in others? The present paper makes an empirical contribution, showcasing understudied facts from Ojibwe (*qua* Central Algonquian) and Onondaga (*qua* Northern Iroquoian), with the conclusion that NI unfolds via phrasal movement (Barrie and Mathieu 2012) rather than via head movement (Baker 1988, 1996, 2003, 2009).

To illustrate NI, consider the following two examples from Onondaga (Woodbury 1975: 14–15). Observe that the direct object may appear separately from the verb (1a) or as an incorporated element in the verb (1b).[1]

(1) a. waʔhahninúʔ neʔ oyɛ́kwaʔ [Onondaga]
waʔ- ha- hninu -ʔ neʔ o- yɛkw -aʔ
FACT- 3.SG.M.AG buy -PUNC NE NPREF- tobacco -NFS
'He bought tobacco.'

b. waʔhayɛ́kwahninúʔ
waʔ- ha- yɛkw- a- hninu -ʔ
FACT- 3.SG.M.AG- tobacco- EPEN- buy -PUNC
'He bought tobacco.'

Consider now two examples from Ojibwe. The direct object may appear separately from the verb (2a) or as an incorporated element (2b).[2]

[1] Four line glosses are given where this information is available. Otherwise, examples are presented here as they appear in the original sources. In all cases, however, the abbreviations have been made uniform. The following abbreviations are used: 1A = first person agent, ABS = absolutive, ACC = accusative, ADV = adverbial, AG = agent, ALL = allative, AN = animate, APPROX = approximative, AUX = auxiliary, CAUS = causative, COM = commitative, COND = conditional, DAT = dative, DECL = declarative, DEG = degree, DET = determiner, DIM = diminutive, DIR = directional, DIST = distributive, DS = different subject, DU = dual, DUR = durative, EMPH = emphatic, EPEN = epenthetic, ERG = ergative, F = feminine, FACT = factual, FUT = future, GEN = gender, HITH = hither, IDO = internal direct object, IMP = imperfective, HAB = habitual, IN = inanimate, IND = indicative, INSTR = instrumental, INVIS = invisible, JOIN = joiner vowel (an epenthetic vowel in Northern Iroquoian NI constructions), LV = light verb, M = masculine, MD = mood, N = neuter, NE = a nominal particle related to definiteness and specificity in Iroquoian languages, NEG = negation, NF = non-future, NFS = noun forming suffix, NFUT = non future, NOM = nominative, NPREF = nominal prefix, NT = neutral, NUM = number, NZLR = nominalizer, O = object, OBL= oblique, OBV = obviative, PAT = patient, PEJ = pejorative, PL = plural, POSS = possessive, PRES = present, PRO = pronoun, PROX = proximate, PST = past, PUNC = punctual, Q = interrogative, R = realis, REF = referential, REL = relativizer, REV = reversative, S = subject, SRFL = semi-reflexive, SG = singular, SS = same subject, STAT = stative, SUF = suffix, TR = transitive, VAI = Verb Animate Intransitive, VBLZ = verbalizer, VII = Verb Inanimate Intransitive, VTA = Verb Transitive Animate, VTI = Verb Transitive Inanimate.

[2] Ojibwe encompasses varieties of the language called by different names in English, including Odawa, Ottawa, Chippewa or Ojibway. While the language is spoken over a vast region of central Canada and in US border states from Michigan to Montana, the varieties of the language used in this study are those found in Valentine (2001), i.e. dialects spoken in southern Ontario between the shores of Lake Huron to the east, roughly as far as the Ottawa River. The dialects also include Algonquin as spoken in Quebec.

(2) a. ngii-moonahwaa mashkiki [Ojibwe]
n- gii- moon -ah -w -aa mashkiki
1- PST- dig -VTA -AN -3 medicine
'I dug up medicine.'
b. ngii-moonahashkikiwe
n- gii- moon -ah -ashkiki -e
1 PST- dig -VTA -medicine -VAI
'I dug up medicine.' (Rhodes 2003:10)

A point of contention is whether NI is syntactic or lexical (Sadock 1986; Baker 1988; Rosen 1989; Baker et al. 2005), a debate that goes back to the early 20th century and to the exchange between Kroeber (1909) and Sapir (1911). First, we review the evidence against a (lexical) compounding analysis (Sect. 1.1) and second, we introduce the syntactic view of NI (Sect. 1.2), first by revisiting the head movement analysis, then turning to the phrasal movement account explored in this paper.

1.1 Noun incorporation is not compounding

Evidence that NI is not lexical compounding but is rather a syntactic phenomenon comes from several sources. Di Sciullo and Williams (1987) propose discourse referentiality as a diagnostic for syntactic independence. Thus, as shown in (3) for Mohawk and (4) for Ojibwe, the incorporated noun (IN) is referential since it can be picked up in subsequent discourse.[3,4]

(3) Thetʌˈre' wa'-ke-nakt-a-hnínu-' [Mohawk]
yesterday FACT-1.SG.AG-bed-∅-buy-PUNC
I-k-her-e' Uwári ʌ-ye-núhwe'-ne'
∅-1SG.AG-think-STAT Mary FUT-3.F.SG.AG-like-PUNC
'I bought a bed yesterday. I think that Mary will like it.' (Baker 1996:288)

(4) ngii-moonahapnii mii dash ngii-giziibiiginigan [Ojibwe]
n- gii- moonah -apnii -e mii dash
1- PST- dig -potato -VAI and then
n- gii- giziibiiginig -an
1 PST- wash -3PL
'I dug up potatoes, and then I washed them.' (BJ, 2008-12-17)

Much of the original data used in this article are taken from fieldwork undertaken with members of The Chippewas of Nawash Unceded First Nation at Cape Croker (Neyaashiinigmiing) on the Eastern shore of the Saugeen (Bruce) Peninsula and with members of the Algonquin community at Kitigan Zibi, at Barriere Lake and at Lac Simon, Quebec.

[3]While we use mainly data from Onondaga to illustrate the properties of NI in Northern Iroquoian, we sometimes make use of other Northern Iroquoian languages as data permits. The syntax of Northern Iroquoian languages is remarkably uniform, allowing easy comparison.

[4]Observe that there is no morphological evidence of an anaphoric dependency in (3). Inanimate objects never trigger agreement in Northern Iroquoian languages. The context, however, makes it clear that the bed is being referred to in the second sentence. See Baker (1996:287f) for further explanation and more examples.

By contrast, in English it is not possible for the first noun in a compound to be referred back to in discourse. In (5) *dog* cannot co-refer with the pronoun *it* (example from Baker 2003:273).

(5) #The new doghouse seems to disturb it (the dog).

Note also that the stranding of adjuncts that modify the IN is possible in Ojibwe. This suggests that NI is syntactic, as stranding creates a non-local dependency (Baker 1988, 1996) (6a) is an example from Ojibwe showing stranding of a demonstrative. (6b) illustrates stranding of a possessor (for stranding in Cree, see Mellow 1989).

(6) a. Ngii-bimoomaawazo maaba [Ojibwe]
n- gii- bimoom -aawazo -e maaba
1- PST- along.carry.on.back -child -VAI this
'I carried this child (on my back).'
b. Ngii-bimoomaawazo Zhaabdiis
n- gii- bimoom -aawazo -e Zhaabdiis
1- PST- along.carry.on.back -child -VAI John
'I carried John's child (on my back).'

Adjunct stranding is likewise possible in Onondaga (7), a fact pointed out for Mohawk by Baker (1988).[5]

(7) wa?genakdahnínú: nęge? [Onondaga]
wa?- k- nakt- hninu- ʔ nęke?
FACT- 1.SG- bed- buy- PUNC- that
'I bought that bed.'

In contrast, adjunct stranding is not possible in English compounding. As shown by (8), nouns in compounds cannot be modified. This follows from the fact that *dog* is never syntactically independent from *house*.

(8) a new doghouse
= (i) 'a new house for a dog'
≠ (ii) 'a house for a new dog'

We take this contrast to show that NI is undeniably syntactic in comparison with English compound formation. Like Baker (2003), we take compounding as a case of root-root merger in the lexicon.[6] We adopt the general principles of Distributed

[5]Rosen (1989), however, points out that stranding in Northern Iroquoian is available regardless of NI, a fact that can be shown in Onondaga. Thus, unlike the case for Algonquian, stranding in and of itself may not be used as an argument for a syntactic analysis of NI (see Barrie 2012, 2015, for more details).

(i) wa?khnínú: nęge? [Onondaga]
wa?- k- hninu- ʔ nęke?
FACT- 1.SG- buy- PUNC that
'I bought that one.'

[6]See Harley (2009) for an analysis of root-root merger via head movement.

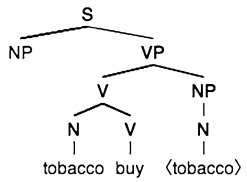
Morphology (specifically, that words are formed by successive instances Merge of roots and functional structure). While DM dispenses with the distinction between inflectional and derivational morphology, we refer to these terms below, but only descriptively. Also, while the thrust of our argument is that NI is not and cannot be formed by head movement, we do not make claims of its existence for other aspects of language.

1.2 Noun incorporation is syntactic

The literature provides much evidence that points to the view that NI is syntactic. There are two ways to account for NI syntactically. We first review the head movement analysis made famous by Baker (1988, 1996, 2003, 2009). Then, we turn to our proposal, namely that the derivation of NI involves phrasal movement (for a primer, see Barrie and Mathieu 2012).

The traditional view of syntactic derivations of NI constructions is that they arise by head movement (Baker 1988, et seq.). The tree diagram in (9) is a simple representation of the configuration after movement of the noun into the verb (adapted from Baker 1996:13) ⟨tobacco⟩ is the copy of the raised N.

(9)



This is a simple and elegant solution that captures many properties associated with NI and it is a prevalent account of NI within the generative framework. Baker (2009), for example, is adamant that head movement is still needed for NI.

However, one obvious question that comes to mind when appealing to head movement for NI is whether it is compatible with minimalist assumptions. Once a legitimate syntactic operation (Travis 1984; Baker 1988; Pollock 1989), head movement is now problematic within the logic of minimalist syntax. Chomsky (2001), in particular, mentions several properties associated with XP movement that are not shared with head movement. For example, head movement is not strictly cyclic; it violates the Extension Condition;[7] it does not have interpretive effects;[8] it does not involve feature-matching;[9] and the trace or copy is not c-commanded

[7]The Extension Condition is independently problematic (adjunction does not observe it and nor does LF-movement) and was abandoned in Chomsky (1995, Chap. 4) in favour of a definition of "strong features" that derived the desirable part of the Extended Condition without the obvious problems.

[8]There are cases where head movement has been claimed to involve interpretive effects (see Lechner 2006; Roberts 2010). We do not think the evidence is overwhelming, but since the present paper is not about head movement generally, its focus being on NI, we do not discuss this issue further. NI has clear interpretive effects (the noun is a kind of background topic or a generic, it takes narrow rather than wide scope, etc.; see Mithun 1984 and many others).

[9]But see Roberts (2010) and Sect. 6.4 in the present paper.

by the moved head under a basic definition of c-command[10] (Fanselow 2003; Mahajan 2003).[11] In addition, given Bare Phrase Structure and the distinctiveness condition associated with it, it is impossible for complex head structures to arise in the first place (Chomsky 1995, 2001). When two lexical items, α and β undergo Merge, the result is a phrasal expression $\{\gamma, \{\alpha, \beta\}\}$, where γ is either α or β. This is true even if α and β are both heads.

Since head movement no longer fits within narrow syntax, the trend has therefore been, following Chomsky's (2001) suggestion, to relegate it to PF (Boeckx and Stjepanović 2001).[12] To quote Chomsky:

> "There are some reasons to suspect that a substantial core of head-raising processes, excluding incorporation in the sense of Baker (1988), may fall within the phonological component." (Chomsky 2001:37).

What is intriguing in Chomsky's remark is that incorporation is seen as an exception to the claim that head movement is PF movement. This idea is also found in Baker (2009, 2012) where it is claimed that head movement is still very much needed for NI.

Chomsky does not explain why incorporation should be seen as an exception. One possibility is that NI is unique because it involves movement of a lexical head (N) to another lexical head (V). This contrasts with other types of head movement, which involves movement of a lexical head to a functional head (e.g., V-to-T, N-to-D), or movement of a functional head to another functional head (e.g., T-to-C). NI, in particular, is a grammatical function-changing phenomenon (Baker 1988) that involves syntactic alternations in the grammatical encoding of referential expressions.[13]

It is clear that NI is syntactic, but making NI an exception to the idea that head movement is PF movement begs the question as to why violations of core syntactic principles should be tolerated in this particular case. This is our starting point. What we focus on is this: treated as head movement, NI violates basic assumptions of Bare Phrase Structure, the Extension Condition, cyclicity (it involves incorporation but not excorporation), and the c-command requirement on traces. If narrow syntax is a self-contained, orderly, and rigorous engine, then it should not tolerate operations that violate its core rules and principles.

[10] On Kayne's (1994) definition of c-command, where the segment/category distinction is recognized, there is of course nothing wrong with head movement from a c-command point of view. A definition of this sort seems independently supported by well-known cases such as "Nobody's articles ever get published on time" and "Every boy's parents think he is a genius", which could be extended to head movement.

[11] Chomsky (2001) also mentions Grodzinsky and Finkel's (1998) work, which shows aphasics are sensitive to the XP-/X^0-chain distinction but treat head chains in a special way, which militates against subsuming both XP- and X^0 chain formation under the same checking operation.

[12] Others have proposed more radical solutions: head movement is seen as completely obsolete and is replaced by Remnant movement operations with the consequence that only one type of movement exists, namely phrasal movement (Aldridge 2003; Bhatt and Dayal 2007; Cecchetto 2004; Haegeman 2000; Koopman and Szabolcsi 2000; Müller 1997; Pollock 2003; Zwart 2004).

[13] If the exceptional nature of NI is connected to its grammatical function changing properties, then presumably we are facing not one, but several exceptions, since there are quite a few grammatical-function changing phenomena that have been claimed to involve head movement, including passive, antipassive, causative and applicative constructions. In this paper, we focus on NI and leave the other grammatical-changing phenomena aside.

There are three logical solutions to the problem that NI as head movement presents. If NI is head movement in the syntax, then we must re-establish in the syntax all other types of head movement recently relegated to PF (with a theory that relaxes the Extension Condition and other relevant constraints that make head movement unwelcome).[14] Alternatively, if NI is head movement at PF (like other head movement phenomena), then it is not a syntactic phenomenon.

The first solution can be found in Roberts (2010), where head movement is a reflex of Agree relations, and as such it does not violate any core syntactic principles. Incorporation, be it noun, verb or preposition incorporation, can be handled nicely in such a theory. The second solution, namely to treat NI as PF movement, is not valid because NI is clearly syntactic (Baker 1988, et seq.).

We opt for a third logical possibility: NI is syntactic but not head movement. Rather, it is phrasal movement. Our contribution is empirical: we introduce new data showing that, contrary to popular wisdom, INs are larger than bare roots. Since our main goal is to account for NI and show how it involves INs larger than roots, we remain agnostic about the status of head movement in general. What is clear, on our view, is that all instances of syntactic NI are cases of phrasal movement. If there is a consensus that head movement really *is* a PF operation, then our conclusions indicate NI is no longer an exception.

The motivation behind our proposal that NI is phrasal movement is that, cross-linguistically, nominals larger than bare roots undergo incorporation in such a way that head movement could not be involved. This state of affairs contradicts not only Baker's (1988, 1996, 2009) analysis of NI, but also Roberts' (2010) account of NI.[15] Our proposal converges with other accounts that reanalyse certain head movement phenomena as XP movement (Koopman and Szabolcsi 2000). However, we believe that deciding whether phenomena traditionally accounted for in terms of head movement are in fact XP movement phenomena is an empirical question.[16]

In this paper, we focus on NI and while this paper concentrates on data from Algonquian and Iroquoian, we believe our account generalizes to NI in other languages, modulo language-specific differences.

[14] Den Dikken (2007a, 2007b) proposes a Phase Extension approach to verb raising (and object shift) which avoids problems with cyclicity pointed out in Chomsky (2001) (and solved there differently). The particular problem mentioned regarding cyclicity, due to the absence of excorporation in head movement, may be resolved by pointing to the morphological nature of (most of) head movement. Lack of proper c-command of the trace of a head-moved element by its antecedent may not be a real problem, given the fact that the result of head movement, i.e. the amalgam, does c-command the trace in question and given that this depends on the definition of c-command.

[15] We leave aside discussions of verb and preposition incorporation discussed in Baker (1988). We have no a priori reason to assume a uniform mechanism for all types of incorporation, given that noun incorporation itself is far from uniform. Verb incorporation involves a kind of complex predicate formation distinct from noun incorporation. The key insight in Baker's analysis of incorporation is that applicative formation can be thought of as incorporation of a preposition. As a functional element, however, incorporation of a preposition may proceed along completely different lines than that of incorporation of a nominal complex.

[16] There are undeniably cases of PF head movement that need no analysis in the syntax—see Roberts (2010) about subject procliticization in French (Kayne 1983; Rizzi and Roberts 1989). Conversely, there are cases where an XP account might be welcome such as V2 in Germanic reanalysed as XP movement in Müller (2004). See also Bentzen (2007) and Wiklund et al. (2007). This proposal finds support in the fact that past participles can front on their own, indicating that a VP rather than a verbal head raises to Spec-CP (den Besten and Webelhuth 1990).

1.3 Organization

This is how we proceed. Section 2 introduces the analytic framework on which our analysis is based. Section 3 introduces data from Ojibwe (*qua* Algonquian) that show that INs can be larger than bare roots. Section 4 presents data from Onondaga (*qua* Iroquoian) showing the same thing. Section 5 introduces data from other languages, namely, Inuktitut (Inuit) and Crow (Siouan), showing that data on NI in these languages are also better explained by XP movement rather than by head movement. Section 6 reviews the implications of the phrasal NI analysis. Section 7 concludes.

2 Modeling noun incorporation

In this section, we introduce our analytic framework. We propose that the size of an IN varies according to the language and also sometimes on the construction (e.g., whether it is NI with a lexical verb or with a light verb), but what is clear is that in many cases it is impossible to put forward a head movement analysis because either the IN is too large, appearing with prefixes, suffixes, or both, or additional morphology appears between the verbal root and the IN. In order to account for the diversity of NI constructions we suggest that the properties of NI can be understood along three microparameters.

(10) a. The size of the IN
b. The identity of the incorporator
c. The category of the IN

This view of NI has the advantage of accounting for all the varying properties of the construction cross- and intra-linguistically and is thus superior to the Polysynthesis Parameter of Baker (1996), a macroparameter that has the unfortunate consequence of rejecting Algonquian and other languages outside the realms of languages with NI (see Legate 2002 and Adger et al. 2009 for the idea that polysynthesis can be reduced to microparameters). Since Iroquoian does not even seem to behave as it should according to the macroparameter it was designed for, as we shall see in Sect. 4, we suggest it is best to dispose of the Polysynthesis Parameter.

This has the advantage of going back to a more traditional notion of NI, one that is more inclusive and that does not have the undesirable result of excluding Inuit and Algonquian languages from the set of polysynthetic languages (see Baker 1996). We end the paper with the idea that the morphological property that necessarily comes with NI (e.g., the noun and the verb agglutinate) originates from an independent property of the grammar in this type of language: the *v*P in Algonquian languages and the CP in Iroquoian languages form a single word at PF because the domain of a word is not the prosodic word, but the phonological phrase (see also Dyck 2009).

First, we give more details about the microparameter in (10a), where we discuss the size of the IN. Second, we turn to the microparameter in (10b), where we discuss the host of the IN—the incorporator. The microparameter in (10c), the category of the incorporated element, is not covered in detail here but is addressed briefly in Sect. 6. That is, we discuss incorporation only of nominal elements, setting the incorporation

of adverbial elements aside for further research. Also not discussed here is preposition incorporation in the applicative structures studied by Baker (1988), although we believe these may not fall under the purview of our research question as preposition incorporation involves the incorporation of a functional, as opposed to a lexical item (see footnote 15).

2.1 The target of noun incorporation

The target of NI can in principle be any phrasal projection in the nominal domain as in (11): *n*P (categorized/nominalized stems), *d*P (modified N-stem), DP (possessor DPs, demonstratives), KP (case-marked nominals), and CP (relative clauses). Importantly, all these cases are morphological cases of NI rather than instances of pseudo noun incorporation (PNI, as in Massam 2001; Dayal 2011; Baker 2012) where no morphological merger occurs (in PNI, the noun and the verb form two separate words). All the cases at hand involve agglutination: the noun merges with the verb to form one single word.

(11) $[_{CP} \ldots [_{KP} \ldots [_{DP} \ldots [_{dP} \ldots [_{nP} \ldots [_{ROOT}]]]]]]$

We assume that any phrasal projection in the nominal domain is potentially a phase for the languages discussed in this paper.[17] Such phases are syntactic, since phonologically they may not match with prosodic words/phrases (see Compton and Pittman 2010 for Inuit). This contrasts with the notion of phases (proposed for languages such as English or French), since these are based on their propositional completeness as well as their phonological independence (see Sect. 6 for details about "wordhood" in polysynthetic languages).[18]

For *d*Ps we adopt Cinque's (2010) proposal that adjectives are merged into a highly structured and articulated DP structure as follows.

(12) $[_{DP} [_{NumP} [_{FP}$ (reduced) relative clause $[_{dP} [_{FP}$ direct modification $[_{NP}]]]]]]$

He proposes the projection *d*P (a light D), which is responsible for referential import, akin to what we stated for *n*, groups modifiers and nouns (note that the ultimate source of referentiality is not of primary concern here. The general point is that if an IN can be referential, it must have some functional structure). Getting to the adjectives, Cinque shows that the two major class of adjectives (i) indirect modifiers/(reduced) relative clauses and (ii) direct modifiers have two distinct structural sources. Furthermore, not all languages have both kinds of adjectives. Cinque (2010:35) mentions several languages that do not have direct modification adjectives.

Two questions arise at this point. First, what determines, for a given language, what the target of NI is? The answer to this question is simple: selection and features. Depending on the NI language (a language that has NI), the verb selects an *n*P, a *d*P, a

[17] Only CP and *v*P are phases for Chomsky (2001), and also DP for Adger (2003); but see Marantz (2001), where it is argued all categorizing heads are phases.

[18] Non-agglutinated phases in polysynthetic languages are like English and French phases: both syntactic and phonological phases (see Chomsky 2008 for a different conception of phases).

DP, a KP or a CP by way of categorical features (*n*, *d*, D, K or C). This selection process is no different from the properties that certain verbs have in selecting CPs, TPs, or even smaller complement domains in non-polysynthetic languages (so-called restructuring phenomena). Selection of complements is generally open to much cross-linguistic variation: in English, the verb *phone/call* selects a DP whereas in French, the verb *téléphoner* 'phone/call' selects a PP (for the purposes of the discussion PP = KP). In reverse, the English verb *look* selects a PP (*look at*) while French *regarder* 'look at' selects a DP. This is idiosyncratic and presumably must be learned.

2.2 The host of phrasal noun incorporation: V or *v*

There are two ways the IN is introduced into the verbal domain: (13a) or (13b). (13a) corresponds to lexical verb NI while (13b) is the representation for light verb NI.

(13) a. $[_{VP}$ V XP]
b. [XP [*v* [V . . .]]]

While both lexical verb NI and light verb NI are productive in Ojibwe, Onondaga has only productive lexical NI, while light verb NI is highly restricted. Although not discussed here in detail, some languages have only light verb NI (Inuktitut, discussed briefly in Sect. 5.1). This is simply a matter of lexical decision, choice, or availability.

2.3 Minimal versus maximal projections

One question that results from our proposal is how the X/XP contrast arises on our account, given current theoretical assumptions.[19] Is it via the traditional templatic labeling of X-bar theory or contextually, via a version of the X^{min} and X^{max} convention introduced by Muysken (1982)? The reason why this issue is raised is because the X/XP (head/phrase) is not a primitive within Minimalist theory (Chomsky 1995; Carnie 2000).

We assume Bare Phrase Structure here and adopt the following formalisms for the distinction between a head and a phrase. A head is a syntactic object that is selected from the Lexicon and merged into the derivation. A phrase is a set of the form $\{\gamma, \{\alpha, \beta\}\}$, where α and β are syntactic objects, be they lexical items (heads) or other phrases. XP movement, then, is simply internal merge of a set of the form $\{\gamma, \{\alpha, \beta\}\}$. Head movement is tricky, however. As mentioned above, there is no set-theoretic way to capture the complex head formed by head movement. We assume there is some technical solution to this (although it doesn't really matter for our purposes since we show that the IN is an XP in the languages we discuss). To be clear about our argumentation below, we put forth the following claims. Assuming the Mirror Principle (Baker 1985), a verbal complex of the form V-F_1-F_2 can be formed by head movement assuming a functional hierarchy $F_2P > F_1P > VP$, where F stands for any functional projection. What we show here, however, is that the IN cannot have been built by head movement (at least not solely by head movement) as it exhibits non-mirror effects. Specifically, assuming the same functional hierarchy $F_2P > F_1P > VP$, the IN has the shape F_2-V-F_1. We discuss the precise structure in the following

[19] Thanks to Reviewer #3 for calling attention to this question.

sections in detail. Thus, our account does not rely on a primitive distinction between heads, phrases, head movement and XP movement per se. Rather, the evidence we present merely indicates that NI takes place by XP movement.

3 Phrasal NI in Ojibwe (Central Algonquian)

In the present section, we focus on Algonquian languages, with an emphasis on Ojibwe. As pointed out above, there are two varieties of NI in this language. Either the verbal element is a verb and NI is optional (Sect. 3.2) or the verbal element is a suffix, i.e. a light verb (Sect. 3.3) and NI is obligatory. Section 3.4 introduces residual phenomena that illustrate root-root merger. But first, we introduce background information on Ojibwe morphology.

3.1 Background on Ojibwe morphology

In Ojibwe, two morphological templates are at play, according to whether NI applies to a lexical verb or a light verb. In Algonquianist parlance, what is analysed as lexical verb NI involves a tri-partite verb stem structure as in (14). The initial corresponds to the V-root, the "medial" to the IN, and the "abstract final" to a transitivity marker. When NI takes place, the "abstract final" is always taken from the intransitive series ("abstract VAI finals"). In contrast, when a noun is not incorporated, as in (15), the "abstract final" is taken from the transitive series ("abstract VTA finals"). This verbal complex will be marked as *v**P, which for this paper and for Ojibwe we take to be identical to VP (the root and the transitive *v* together form the VP).

(14) Algonquian template for lexical verb NI

. . .-[VSTEM	initial		-medial		-final	]- . . . [D [NP]]
	|		|		|	
	Root		-IN		-V.INTRANS	

(15) Algonquian template for unincorporated nouns

. . . -[VSTEM	initial		-final	]- . . . [D [NP]]
	|		|	
	Root		-V.TRANS	

As for light verb NI, it involves a bi-partite structure, consisting of a "concrete final" (analysed as a light verb) and a stem-external "preverb" constituent (analysed as an IN), as in (16). These verbs are a closed class and consist of three formatives, which introduce distinct event structures. In this paper, we will use *-wi* 'be', *-i* 'have' and *-ke* 'make' as illustrations. NI is obligatory with light verbs. Thus, (17) is unattested (For the distinction between concrete and abstract finals, see Denny 1978 and Mathieu 2008—both abstract and concrete finals are instances of *v*, but while concrete finals are light verbs in the sense of Johns 2007, abstract finals are not. Our definition of light verb as relevant for Ojibwe is different from what is assumed in Distributed Morphology or in Butt 2010).

(16) Algonquian template for light verb NI

. . . -preverb-[VSTEM	-final	]- . . .	
IN-		Verb	

(17) (Algonquian verbs don't permit unincorporated nouns)
*. . . -[VSTEM -final]- . . .
Verb

The different way lexical verbs and verb stems combine with INs has important consequences. In Ojibwe, the INs that combine with lexical verbs undergo "morphological fusion" (in the DM sense), inasmuch as this is equated with phonological integration (e.g., resyllabification, glide formation, etc.) while the INs that combine with verb stems ('be', 'have', 'make') do not undergo morphological fusion in the DM sense, as their retain they phonological integrity (there is broad agreement about this in the Algonquianist literature, see Slavin 2012, etc.). Although both types of NI are phrasal in nature and involve phrasal cliticization, we assume this reduces to the fact that while lexical verb NI is stem-internal, light verb NI is stem-external (Piggott and Newell 2007 for similar facts).

The fact that lexical verb NI is more restricted in the number of phrases it can select and incorporate in comparison with light verb NI (see Sect. 3.3) may stem from the way the two verbs combine with their arguments. In the first case, the boundary between the verb and the IN is weak. In the second case, it is strong. Note for example that in (2b) the IN *mashkiki* 'medicine' loses its initial consonant 'm' when it incorporates. This is not uncommon. In addition, hiatus is often not tolerated in such contexts. In light verb NI, hiatus is tolerated between the verb and the IN or epenthesis occurs (Piggott and Newell 2007 for related facts).

3.2 Ojibwe lexical verb NI

Lexical verb NI in Ojibwe satisfies Baker's (1996) conditions for true NI: (i) NI is reasonably productive; (ii) IN is fully integrated with the verb morphologically; (iii) the noun is referentially active in the discourse; (iv) Both the noun and the verb root can be used independently. Thus, although INs are XPs in Ojibwe, they nevertheless undergo morphological incorporation with the verb, indicating that they are not instances of pseudo noun incorporation (PNI) in Massam's (2001) sense (see Sect. 6 for discussion of PNI). To avoid any confusion, everything points to the view that the type of NI we describe is true NI and not something different from the classical cases described by Baker (1988, 1996, 2003, 2009).

First, we show that, in Ojibwe, lexical verb NI applies to *n*P (Sect. 3.2.1) and then we give an exemplification of how we formally derive lexical verb NI in Ojibwe (Sect. 3.2.2).

3.2.1 Ojibwe lexical verb NI applies to nP

Let us start with a simple example. In (18a), the noun *miijim* 'food' incorporates into the lexical verb *naad* 'fetch/get', forming a single phonological word. The operation is very productive (Michelson 1917; Wolfart 1971; Mithun 1984; Mellow 1989, 1990; Hirose 2003). When it occurs, it also interacts with transitivity agreement. Observe

that in the non-incorporated form, (18b), the verb is marked with transitive agreement and object agreement whereas in the incorporated form, (18a), the verb is marked morphologically intransitive (no object agreement surfaces). Note also that the IN is inside the stem (this is stem-internal incorporation), since it is in a medial position between an initial (*naad* 'fetch') and a final (*-e* 'VAI'), cf. (14) above. Witness the fact that the noun is to the right rather than the left of the verbal incorporator. Finally, the *-i* that appears between the lexical verb *naad* 'fetch' and *miijim* 'food' is an epenthetic vowel (Slavin 2012) and triggers palatalization.

(18) a. gii-naajimiijime [Ojibwe]
gii- naad -i -miijim -e -w
PST- fetch -EPEN -food -VAI -3
'He went after some food.' (adapted from Rhodes 1976)

b. nga-naadin miijim
n- ga- naad -in miijim
1- FUT- fetch -VTI food
'I will get food.' (http://www.msu.edu/user/dearhous/misc.html)

In (18), the noun *miijim* 'food' is simplex, i.e. it does not surface with an overt nominalizer. However, and this is the first crucial piece of evidence for a phrasal analysis of NI, Ojibwe also allows the incorporation of nouns that surface with nominalizers. Consider (19a) where the IN surfaces with *-an*. The noun, through a process of nominalization, also contains the detransitivizer (anti-passivizer) *-ge* that takes a transitive verb to return an intransitive verb (Valentine 2001). The noun 'bread' is made from the transitive verb 'cut' that is turned into an intransitive verb and then the whole thing is nominalized. This nominalizer *-an* surfaces on independent nouns as well, as shown in (19b). This example shows that the IN is an *n*P. As illustrated by (19a′), the sentence is ungrammatical if the IN appears without the nominalizer.

(19) a. gii-naajibakwezhgane [Ojibwe]
gii- naad- i- [bakwezhi -ge **-an**] -e
PST- fetch- EPEN [cut -VAI -NZLR] -VAI
'He/she went after some bread.' (PC, 2008-05-05)

a′. *gii-naajibakwezhge

b. ngii-naadin bkwezhgan
n- gii- naad-in [bakwezhi -ge **-an**]
1- FUT- fetch-VTI [cut -VAI -NZLR]
'I got bread.'

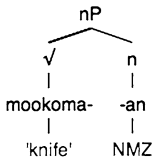
The example in (20) (see also example (4) in Sect. 1) shows that it is possible in Ojibwe to refer back to the IN in subsequent discourse. The IN in (20) *naagan* 'dish' surfaces with an overt nominalizer *-an*.

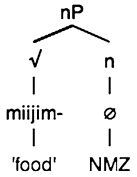
(20) ngii-bengwhinaagane mii dash taaswin ngii-atoonan [Ojibwe]
n- gii- bengw -h -i -naag -an -e
1- PST- dry -VTA -EPEN -dish -NZLR -VAI
mii dash taas-win n- gii- atoon -an
and then cupboard-NZLR 1- PST- place -3PL
'I dried the dishes, and then I put them away.' (BJ, 2008-12-17)

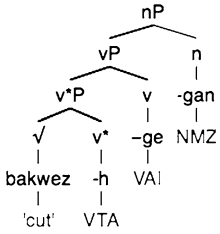
This and the example in (18) (also (4)) show that it is possible to refer back to the IN both when the IN has an overt nominalizer and when it does not. This is an important observation because it shows that NI in Ojibwe is syntactic.

3.2.2 Deriving Ojibwe lexical verb NI via phrasal movement

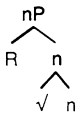
We treat INs as the combination of a base and a category-defining *n* (a nominalizer). In simple cases, the base in question, which is a root, combines directly with a nominalizer as in (21a). When a noun does not surface with a nominalizer we assume that, as in (21b), there is an empty *n* (equivalent to the "zero final" of Algonquianist scholars, e.g., Wolfart 1973:62).[20] In more complex cases, the base is an intransitive *v*P, (21c) (the case of *bakwezhigan* 'bread'). In our analysis, bases are not inherently referential: they need the support of *n* and the projection of *n*P (a maximal projection) in order to be fully referential.

(21) a. 

b. 

c. 

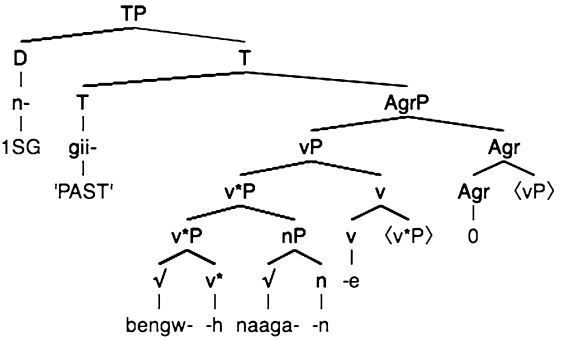
In viewing only maximal projections as referential, we follow Sproat (1985, 1989) and Williams (1989). In particular, we follow Wiltschko (2009) in proposing that *n* introduces in its specifier position an abstract referential (R) argument (Williams 1989) as in (22). In addition, many authors (Carlson 1977; Longobardi 1994; Chierchia 1998; van Geenhoven 1998) propose that bare nouns do not introduce an existential quantifier themselves: depending on the context, either the verb is responsible for introducing an existential quantifier or it is introduced by a null D. Given that languages such as Ojibwe, Mohawk and Onondaga lack determiners, this means that some mechanism other than D must enforce referentiality. We hypothesize that the phrasal projection *n*P in (22) is the locus of referentiality. Note that (22) is at odds with Baker's (2003) idea that incorporated nouns are inherently referential.

(22) 

With this background in place, let us now derive the Ojibwe sentence for *I dried the dishes* in (20) as a sample derivation. The output structure appears in (23), it involves predicate raising (twice).

[20] A zero final is posited with an unanalysable noun root such as *sîsîp-* 'duck' Wolfart (1973:62).

(23)



The derivation goes as follows: First, we build the *n*P *naagan* 'dish', which is the combination of a root *naaga* and a nominalizer *-n* (24a). Second, the verb root *bengw* merges with a transitive final *v -h* (marked *v**), (24b). Once these have been constructed in the workspace, they merge to form a complex *v**P, (24c). Then, an intransitive *v -e* (often considered a detransitivizer in the Algonquianist literature and glossed VAI, see Valentine 2001) merges with the *v**P, (24d). Next, the *v**P complex raises to the specifier of the intransitive *v*P headed by *-e*. This movement is forced by an EPP feature on intransitive *v* and constitutes a kind of predicate raising, (24e)—see Massam (2001) for a predicate raising analysis of NI triggered by an EPP feature in a different family of languages. So far, this resembles the derivation that Branigan et al. (2005) propose for Innu-Aimûn (another Algonquian language). It derives the fact that the IN appears to the right of the verb. Since agreement is present, we postulate merging of the *v*P with an agreement head (phonologically null in this example), (24f). The projection Agr collapses Person and Number. Note that there are cases (e.g., the plural) where separate morphemes surface for Person and Number. Further movement of the complex *v*P to the specifier of the Agreement phrase is triggered by an EPP feature on Agr (yielding a second instance of predicate raising), (24g). Finally, past tense *gii-* appears under T and merges with the agreement phrase, (24h) and the subject proclitic, a D, merges with the TP complex, (24i) (for the idea that prefixes are proclitics while appearing in Spec-TP, see Déchaine 1999).

(24)

		Merge
a.	$[_{n}\ [_{\text{ROOT}}$ *naaga* $]\ [_{n}$ *-n* $]]$	(*n*, ROOT)
b.	$[_{v^*}\ [_{\text{ROOT}}$ *bengw* $]\ [_{v^*}$ *-h* $]]$	(v_*, ROOT)
c.	$[_{v^*\text{P}}\ [_{v^*}$ *bengw-h* $]\ [_{n\text{P}}$ *naaga-n* $]]$	($v\text{P}_*$, *n*P)
d.	$[_{v\text{P}}\ [_{v}$ *-e* $[_{v^*\text{P}}$ *[bengw-h-naaga-n* $]]$	(*v*, *v**P)
e.	$[_{v\text{P}}\ [_{v^*\text{P}}$ *bengw-h-naaga-n* $]\ [_{v\text{P}}\ [_{v}$ *-e* $]\ [<v^*\text{P}>\ ]]]$	(*vP*, *v**P)
f.	$[_{\text{AgrP}}\ [_{\text{Agr}}$ *-*∅ $]\ [_{v\text{P}}$ *bengw-h-naaga-n* $]]$	(Agr, *v*P)
g.	$[_{\text{AgrP}}\ [_{v\text{P}}$ *bengw-h-naaga-n* $]\ [_{\text{AgrP}}\ [_{\text{Agr}}$ *-*∅$]\ [<v\text{P}>]$	(AgrP, *v*P)
h.	$[_{\text{TP}}\ [_{\text{T}}$ *gii-* $[_{\text{AgrP}}$ *bengw-h-naaga-n-*∅ $]]$	(T, AgrP)
i.	$[_{\text{TP}}\ [_{\text{D}}$ *n-* $[_{\text{TP}}$ *[gii-bengw-h-naaga-n-*∅$]]$	(D, TP)

The implication of (24c) is that *n*P is a selected adjunct (two phrasal categories are merged side by side). This is a desirable result, as this accords with observations that adjuncts are amenable to incorporation (see examples (81), (83) below).

3.3 Noun incorporation hosted by *v*: Ojibwe light verb NI

We now turn our attention to the second kind of NI available in Ojibwe, namely the case where the host is *v*, namely a light verb (rather than V, a lexical verb). Following Johns (2007), we use the term "light verb NI" as a label for a particular categorical context (namely verbal), and a particular syntactic context (namely transitive). Accordingly, light verb NI involves the substructure in (25).

(25) [*v* XP]

We argue that in Ojibwe, XP in a configuration such as (25) can be *n*P (Sect. 3.3.1), *d*P (Sect. 3.3.2), or DP (Sect. 3.3.3).

3.3.1 Ojibwe light verb NI applies to nP

To illustrate, in (26) the noun *naboob* 'soup' (an initial) merges with *-ke* (a final in the Algonquian literature) with a general meaning ('make', 'build', 'hunt', 'pick', 'do'; Mathieu 2013).[21] It is not possible for the verbal suffix to appear separately from the noun with which it is associated (26a′). As illustrated in (26b), the light verb *-i* 'have' also takes IN, and likewise cannot appear without the IN, as shown in (26b′).

(26) a. Eric gii-nboobike
Eric gii- naboob -ke -w
Eric PST- soup -make.VAI -3
'Eric was making soup.'
(EP, 2007-04-19)

a′. *Eric gii-ke nboob

b. doodaabaani [Ojibwe]
o- doodaabaan -i -w
3- car -have.VAI -3
'He/she has a car.'
(Valentine 2001:416)

b.′ *iw doodaabaan

The light verbs *-ke* 'make' and *-i* 'have' are both very productive. They occur with many borrowed words confirming that light verb NI in Ojibwe is active and does not denote fossilized expressions (see Corbiere et al. 1999; Valentine 2001; Mathieu 2013).

The first observation we make about this type of NI is that nouns retain their nominalizers. In (27a–b), INs surface with nominalization morphology in the form of *-an* and *-win*. Note that third person agreement with intransitive verbs is suffixal rather than prefixal. Crucially, if the noun is incorporated as a bare root (without the nominalizer), the sentence is ungrammatical as shown in (27a′–b′). These examples show that the IN is an *n*P.

(27) a. bkwezhganke [Ojibwe]
bakwezhig -an -ke -w
bread -NZLR -make.VAI -3
'He/she makes bread.' (PC, 2008-05-05)

a′. *bakwezhig-ke-w

[21] This type of construction is often called a "denominal verb construction". However, this term is misleading because the construction is very much like NI (with respect to referentiality of the noun, stranding of modifiers, etc.) and thus differs significantly from English denominal verbs (Mathieu 2013).

b. ataasowinke
ataaso -win -ke -w
cupboard -NZLR -make.VAI -3
'He/she is making a cupboard.' (Pedchenko et al. 2003)
b′. *ataaso-ke-w

INs in such contexts can also surface with inflectional morphology such as number marking. This is illustrated in (28a) for animates (*makwa* 'bear') and in (28b) for inanimates (*anwi* 'bullet')—Algonquian languages have a gender system based on animacy. Number in Ojibwe is inflectional: it is obligatory; it triggers agreement; it is not possible inside compounds or derivational morphology (Mathieu 2013). Since number marking is fused with gender marking, it is clear that Ojibwe nominals do not lose their gender marking either when they merge with verbal suffixes. Note that gender in Ojibwe has all the properties associated with inflectional gender (Mathieu 2012a, 2012b). These sentences are ungrammatical if a bare root is merged, as seen in (28a′–b′).

(28) a. makwake [Ojibwe]
[makw -a] -ke -w
bear -NUM/GEN -make.VAI -3
'He/she is hunting bears.'
a′. *makwke
b. anwiike
[anw -i] -ke -w
bullet -NUM/GEN -make.VAI -3
'He/she is making bullets.'
b′. *anwke

Ojibwe nominals that participate in light Verb NI can also retain diminutive and pejorative morphology. This is illustrated in (29a). The free form of the nominal appears in (29b).

(29) a. gii-ikwezhenzhishiwi [Ojibwe]
gii- [ikwe -zhenzh -ish] -wi -w
PST- girl -DIM -PEJ -be.VAI -3
'She was a naughty little girl.'
b. bezhig ikwezhenzhish
bezhig ikwe -zhenzh -ish
one girl -DIM -PEJ
'one naughty little girl'

3.3.2 Ojibwe light verb NI applies to dP

Further evidence that nouns in Ojibwe light verb constructions are complex comes from modification phenomena. It is possible, as shown by the examples in (30), for INs to surface with modifiers in Ojibwe. The adjective in (30) definitely modifies the noun and not the whole verbal complex (see Goddard 1990 and Mathieu 2013 for details).

(30) a. ngii-gchi-gwiiwzensiw [Ojibwe]
n- gii- **gichi**- gwiiwzens -wi
1- PST- big- boy -be.VAI
'I was a big boy.'
b. gichi-sabiike
gichi- sabii -ke -w
big- net -make.VAI -3
'He/she is making big nets.' (EW, 2008-05-06)

This contrasts with Ojibwe lexical verb NI in that modifiers cannot surface with INs in this context as shown by (31).

(31) *ngii-moonahgichi-apnii [Ojibwe]
n- gii- moonah gichi- -apnii -∅ -e
1- PST- dig big -potato -NZLR -VAI
'I dug up big potatoes.'

Note that, although not very large, Ojibwe definitely has an adjectival class (Valentine 2001; see also Oxford 2007 for Innu-Aimûn). It is a closed class of some half-dozen 'prenouns' indicating size and dimension, but it can be said to also contain numerals (*bezhig* 'one', *niizh* 'two', etc.). Otherwise, Ojibwe (and Algonquian in general) has intransitive statives as verbal predicates instead of adjectives (as in Iroquoian languages).

3.3.3 Ojibwe light verb NI applies to DP

Ojibwe nominals in light verb NI may also include possessive and person morphology. We saw in (26b) that verbs of possession are formed by merging a verbal suffix *-i* with a nominal. Often possessed nominals in Ojibwe light verb NI constructions are marked with third person prefix *o-* and a possessive suffix *-im*. As shown by (32), nouns forming possessed themes with inflectional suffix *-im* show the suffix in their corresponding verbs of possession as well as third person marking *o-*. Possessive morphology in Ojibwe has all the properties associated with inflectional morphology: it does not change the category it attaches to and (typically and especially in the absence of prefixes) it can apply to any noun (provided, of course, that the resulting meaning is compatible with an acceptable pragmatic interpretation).

(32) a. odakiimi [Ojibwe]
o- d- aki -im -i -w
3- EPEN- land -POSS -have.VAI -3
'He/she has land.' (Pedchenko et al. 2003)
b. mookmaanimi
o- mookomaan -im -i -w
3- knife -POSS -have.VAI -3
'He/she has a knife.'

The possibility of incorporating DPs with possessor morphology is unique to light verb NI, which by hypothesis is hosted by *v*. Observe that this is impossible with lexical verb NI (33), which, recall, is hosted by V.

(33) *gii-naajimookmaanime [Ojibwe]
gii- naad -i -mookoman -im -e -w
PST- fetch -EPEN knife -POSS -VAI -3S
'He fetched his knife.'

On traditional assumptions, the example in (34) shows that the derivation cannot unfold via head movement, since we have the merging of an inflectional affix *-im* after the merging of two derivational affixes *-zhenzh* and *-ish* followed by the merging of a derivational affix *-i*. It is customary to think of inflectional morphology to be outside of derivational morphology. We can understand this result assuming a cyclical derivational model. Although any cyclical model suffices, we explain the derivation in terms of phases (Chomsky 2001, 2008). Under our assumptions the extended nominal projection, DP, is a phase. Thus, the bracketed portion in (34) forms its own cycle (a DP phase) that merges with the derivational affix *-i* in the next phase. Thus, the derivational affix is added after an inflectional affix, but in a higher phase (cycle).

(34) gii-ikwezhenzhishimi [Ojibwe]
gii- [ikwe -**zhenzh -ish -im**] -i -w
PST- [girl -DIM -PEJ -POSS] -have.VAI -3
'He/she has a naughty little girl.'

3.3.4 Microvariation with light verb NI of DP: Ojibwe versus Meskwaki (Fox)

Recall that the logic of our analysis is that NI is phrasal, and that the phrasal target can potentially be any category in the extended nominal projection, namely *n*P, *d*P, DP, KP, CP. Ojibwe (qua Algonquian) NI targets *n*P and *d*P (with lexical verb NI) and DP (with light verb NI). However, the DPs that are available for light verb NI in Ojibwe are restricted to forms that involve some type of co-reference/binding between the subject and the internal argument (for this reason, examples such as (26b) are sometimes translated as 'S/he has it as a car', Wolfart 1973). However, it is interesting to note that Meskwaki (Fox) NI goes one step further in permitting DPs to occur in a preverb position without requiring (i) that they involve co-reference/binding, (ii) that they be restricted to light verbs. This is illustrated in (35). The subject is first person (plural) and the possessed nominal is second person singular. (36) illustrates the non-incorporating version of (35).

(35) Nepyätciketānesawâpagāpen [Meskwaki]
ne- pyätci- ke- tānes-a- wâpag-ā -pen
1- come.to- your- daughter-NMZ- see-VTA -IMP.PL
'We have come to see your daughter.' (Michelson 1917:51)

(36) Nepyätciwâpagāpen ketānesa
ne- pyätci- wâpag-ā -pen ke-tānes-a
1- come.to- see-VTA -IMP.PL your-daughter-NZLR
'We have come to see your daughter.'

As pointed out by Michelson (1917:51), the retention of stem-final *-a* (a nominalizer) in the nominal stem *ke-tānes-a* 'your daughter' is indicative of a word boundary.

Second, the verb is transitive (VTA), i.e. no detransitivization has taken place in contrast to what happens with lexical verb NI. Meskwaki is well-known for this type of "phrasal interfixation", which Michelson (1917) calls "loose composition". Many phrasal categories can pop into (and out of) the preverb position. In particular, the inflected N-stem can also be separated from the verb complex with no change in the morphology of either the N-stem or the V-stem (in particular, with no change in the transitivity of the V-stem). See LeSourd (2009) for discussion and analysis.

Note that the phrase *ketānesa* 'your daughter' is in a preverb position and not inside the stem. Since *ketānesa* 'your daughter' in (35) is morphologically incorporated with the rest of the word and since the whole morphological complex forms a phonological word (there is only one main stress for the whole "word"), we assume that it is NI all the same (see Dahlstrom 1987, 2000, however, for arguments that this is not incorporation).

One last observation regarding Meskwaki: it is also possible for demonstratives to incorporate into the verb as shown in (37). In Ojibwe, this does not appear to be possible.

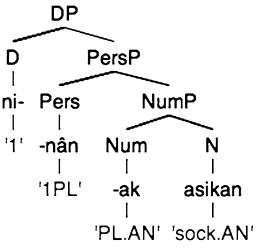
(37) Kici-iniatcimutc^{i} [Meskwaki]
kici- ini- atcimutc^{i}
after- that- narrate
'After he narrated that.' Michelson (1917:51)

On the assumption that demonstratives are Ds, then it appears that incorporated elements in Ojibwe are not just roots (on the status of demonstratives as enclitics in Algonquian, see LeSourd 2011 on Western Abenaki).

3.3.5 Deriving Ojibwe light verb NI via phrasal movement

Following Déchaine (1999), we assume DPs in Algonquian obey a person-number-gender hierarchy in line with the cross-linguistic trend towards a Universal Feature Hierarchy (Greenberg 1963; Noyer 1992; Harley and Ritter 2002). In Algonquian a possessor head appears just below PersP. (38) gives the representation before movement for a Plains Cree DP (from Déchaine 1999:44). That DP contains an Agreement projection followed by a Possessive phrase followed by a Number phrase has been postulated for many languages (Ritter 1991). Person and number correspond to the Agreement phrase in the verbal context presented in (23) above.

(38)



Déchaine argues that, if head movement were involved in such a derivation, we would expect the order in (39b), which turns out to be ungrammatical. Instead, it is the expression in (39a) that is well-formed.

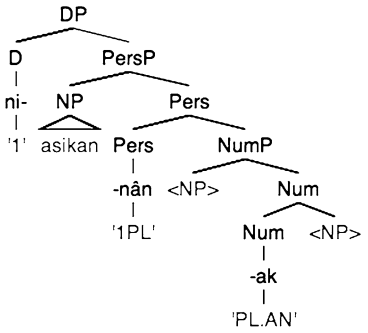
(39) a. nitasikaninânak [Plains Cree]
ni- t- asikan -inân -ak
1- EPEN- sock -1PL -PL.AN
b. *nitasikanakinân
*ni- t- asikan -ak -inân
1- EPEN- sock -PL.AN -1PL
'our socks' (Déchaine 1999:44)

Déchaine shows that the ill-formedness of (40b) (her (44a)) is not an artifact of the analysis. In other languages, the order of morphemes is different. For example, in Yup'ik Eskimo, suffix ordering is consistent with successive head movement. *Angya* 'man' raises to Num *-g* ('3 dual absolutive') and derives a [N-Num] complex that further raises to Pers, deriving [[N-Num]-Pers].

(40) a. angyagpuk [Yup'ik]
angya -g -puk
boat -3DU.ABS- 1DU.ERG
'our (dual) boats (dual)'
b. *angyapukg
*angya -puk -g
boat -1DU.ERG -3DU.ABS

Although the [N-Num-Pers] order in Yup'ik Eskimo is expected if the noun undergoes head movement, in contrast it must be the case that stems in Plains Cree are phrasal and raise in the syntax via phrasal XP movement, since the order in Algonquian is [N-Pers-Num]. This is shown in (41).

(41)



Déchaine (1999) gives two lines of evidence for the idea that Plains Cree stems are phrasal: secondarily possessed forms as in (42a) in which a dependent stem has two layers of possessor agreement and possessor constructions with the verbal suffix *-i* as in (42b) where agreement surfaces not only in relation to the verb's participant but also in relation to the possessed noun.

(42) a. nôstikwânim [Plains Cree]
n- [ô- stikwân -im]
1- 3- head -POSS
'my severed head' (literally, 'my his head') (Déchaine 1999:45)

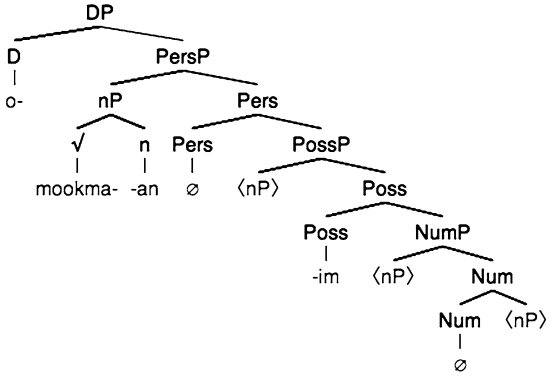
b. omôhkomâniw
[o- môhkomân] -i -w
3- knife -have -3
'He/she has a knife.' (Déchaine 1999:46)

If we take an Ojibwe example with the noun *mookmaan* 'knife', we see that it contains, not only third person agreement *o-*, but also possessive marking *-im*. Consider example (32b) (repeated here as (43)). The possessive morpheme is not deleted when the noun incorporates.[22]

(43) mookmaanimi [Ojibwe]
[**o**- mookomaan -**im**] -i -w
[3- knife -POSS] -have.VAI -3S
'He/she has a knife.'

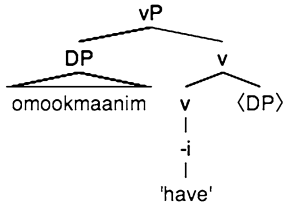
We propose that the *n*P *mookmaan* 'knife' undergoes phrasal movement inside the DP as shown in (44) transiting through successive specifier positions until it reaches Spec-PersP. The DP contains the Person/Number morpheme *o-* that cliticizes to D (sometimes pronounced, sometimes not).

(44)



Once that DP is formed, it raises to the specifier of the intransitive *v*P that corresponds to 'have', as in (45).

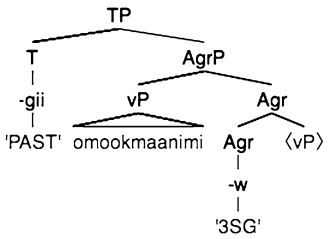
(45)



[22] In some Ojibwe dialects the possessive suffix *-im* tends to be dropped in such contexts (Valentine 2001). However, what is noticeable is that, in this case, the initial *o-* appears and cannot be dropped, as it is the only way to indicate possession. Conversely, when initial *o-* is dropped (depending on the noun, it is retained for example in *odaabaan* 'car'), *-im* must appear.

Finally, the whole *v*P raises to the specifier of an agreement projection (the same one proposed in (23)) headed by *-w*. As already pointed out, contrary to first and second person agreement markers which cliticize onto C (Halle and Marantz 1993; Déchaine 1999; Brittain 2001), third person agreement markers are always suffixes with intransitive verbs.

(46)



3.4 The residue: root merger in Ojibwe

In addition to merging phrasal expressions (*n*P, *d*P, DP), Ojibwe also allows a root noun to merge with a verb; i.e. it allows root-root merger. This type of root-noun/verb merger involves body parts (47a) or classificatory nouns (47b) that are morphologically reduced forms. They do not always correspond to nouns that can appear independently of the verbal complex. For example, the classificatory element *-is* corresponds to the independent nominal *misan* 'firewood'. The element *-is* is missing the morpheme /(i)m/ (analysed as a Generalized Possessor form by Valentine 2002 and seen in examples such as (43)) as well as the nominalizer *-an*. When nouns denoting body parts appear separately from the verb, they are morphologically more complex, the verb is transitive and the interpretation is not that of inalienability. Inalienable nouns are dependent nouns: they must be incorporated with a verb and/or a possessive form.

(47) a. bookjaane
booko -jaan -e
break -nose -VAI
'I have a broken nose.'
(Pedchenko et al. 2003)

b. mnise [Ojibwe]
man -is -e
chop -wood -VAI
'chop firewood.'
(Valentine 2001)

As shown in (48), incorporated body-part nouns do not support anaphora.

(48) *bookjaane mskozi [Ojibwe]
booko -jaan -e misko -zi
break -nose -VAI red -be.VAI
'I have a broken nose. It is red.'(BJ 2008-12-17)

Dependent nouns, which include body-part nouns and classificatory nouns are very much like clitics in that they are obligatorily merged with their hosts. We take them to be defective (in the sense of Roberts 2010, see Sect. 6): they are bare roots. We treat these forms as compounding (see Sect. 1) and thus distinct from *n*P incorporation with a zero *n*.

To summarize, we have argued that there are two kinds of noun incorporation in Ojibwe: one that involves lexical verbs and whose input is limited to *n*P and another that involves light verbs and whose input is much larger, including INs as big as DPs.

4 Phrasal NI in Northern Iroquoian

We turn now to Northern Iroquoian, focusing on Onondaga (while occasionally bringing in data from closely related Northern Iroquoian languages). Regarding the parameters set out in Chap. 2, we will see that Northern Iroquoian incorporates only an *n*P, but not a DP as in Algonquian. Furthermore, we will see that the IN can consist of n + root, n + *v*P, or n + Asp(ect)P. That is, the IN can take the form of the lower portion of the extended verbal projection, which has been nominalized. Following Alexiadou (2001), the highest verbal projection found within a nominalization is the AspP, which accords with the observed facts in Northern Iroquoian. Regarding the other parameter, we will see that Northern Iroquoian has productive NI with a lexical verb as an incorporator and with a light verb as an incorporator, although light verb incorporation is somewhat less prevalent in Northern Iroquoian than in Ojibwe. We also show that there is no interaction between the two parameters. That is whether the incorporator is a lexical verb or a light verb is not correlated with the size of the IN.

This section is organized as follows. Section 4.1 introduces standard cases of NI in Northern Iroquoian. Section 4.2 discusses NI of nominalized verbal forms. Section 4.3 discusses NI with light verb incorporators. Section 4.4 discusses the absence of the incorporation of DPs. Section 4.5 discusses the implications for a Bakerian, head movement analysis. Section 4.6 presents an analysis of NI that relies on XP movement. Section 4.7 is a brief summary.

4.1 Canonical cases of NI

Let us first turn to the canonical cases of NI in Onondaga. In Onondaga, as shown in (49a), the incorporated noun *häkw* 'bread' does not appear with any of the morphology found in the non-incorporated form in (49b). The noun in this case is bare and does not surface with a nominalizer.

(49) a. wa^{ʔ}khägwahnínǫ ^{ʔ} [Onondaga]
wa^{ʔ}- k- häkw- a- hninǫ -^{ʔ}
FACT- 1.SG.AG- bread- JOIN- buy -PUNC
'I bought some/the bread.'(N.C, G.W, 2009-02-09)

b. wa^{ʔ}khníǫ^{ʔ}ne^{ʔ}ohägwa^{ʔ}
wa^{ʔ}-k-hninǫ-^{ʔ} ne^{ʔ} o-häkw-a^{ʔ}
FACT-1.SG.AG- buy-PUNC NE NPREF-bread-NFS
'I bought some/the bread.'(N.C, G.W, 2009-02-09)

In the instances where nouns are derived from verbs, they are typically augmented by a nominalizer morpheme when they are incorporated into a verb. Thus, the nominalizer, -^{ʔ}*tshR*, is added to *atkų* ('be poisonous') in (50a), and the nominalizer, -*shR*, is added to *atęna^{ʔ}t* ('take provisions') in (50b), idiomatically giving rise to the meaning 'groceries'. These examples show that the IN is minimally an *n*P.

(50) a. agatgų^{ʔ}tshé:hwih [Onondaga]
ak- [atkų- *(^{ʔ}tshR)]- ohw -ih
1s.PAT- [be.poisonous- NZLR]- put.in.water -STAT
'I have poisoned it with liquid poison.' (Woodbury 2003:278)

b. agadęna^{ʔ}tshähninų́h
ak- [atęna^{ʔ}t- *(shR)]- hninų -ʹh
1.SG.PAT- [take.provisions- NZLR]- buy -STAT
'I have bought groceries.' (Woodbury 2003:139)

In (51), the nominalizer-*hsR* is added to the root *ǫy* 'breathe'.[23] The examples with nominalizers also show that bare roots in Iroquoian are not categorized, since they surface with categorization morphology. Again, these examples show that the IN is an *n*P.

(51) a. gadųwíhsä:^{ʔ} [Onondaga]
k- at- [ųwi -hsR] -a^{ʔ}
1.SG.AG- SRFL- [breathe -NZLR] -NFS
'my breath' (Woodbury 2003:858)

b. hadųwihsé^{ʔ}ktha^{ʔ}
ha- at- [ųwi- hsR]- o^{ʔ}kt- ha^{ʔ}
3.SG.M.AG- SRFL- [breathe- NZLR]- finish- HAB
'He is running out of breath.' (Woodbury 2003:858)

4.2 Incorporation of nominalized verbal phrases

Interestingly, some INs in Iroquoian contain even more structure than a root plus a nominalizer. Consider the following Onondaga example (Woodbury 2003:102). The nominal form in (52a) has been incorporated in (52b). The incorporated element is morphologically complex, consisting of a semi-reflexive marker, the root, and a nominalizer. Assuming the semi-reflexive marker is part of the argument structure of the root, the incorporated element here consists of a VP plus nominalizer.

(52) a. ada^{ʔ}dítshä:^{ʔ} [Onondaga]
Ø- at- a^{ʔ}ti -tshR -a^{ʔ}
NPREF- SRFL- lean -NZLR -NFS
'cane/crutches'

b. hoda^{ʔ}ditshé:da^{ʔ}
ho- [at- a^{ʔ}ti -tshR]- ot -a^{ʔ}
3.SG.M.PAT- [SRFL- lean -NZRL]- stand.upright/have -STAT
'He is using a cane.'

The following Oneida example is even more striking (Michelson and Doxtator 2002:255).[24] The nominal form in (53a) has been incorporated in (53b). The incor-

[23] Observe that the appearance of the nominalizer triggers allomorphy in the root in (51), although this is tangential to the discussion.

[24] As already pointed out, the syntactic properties of the Northern Iroquoian languages are remarkably consistent, allowing ready comparison among the various languages.

porated element is morphologically complex, consisting of a semi-reflexive marker, the root, a reversative marker, and a nominalizer. Thus, here we have an AspP plus nominalizer, in accordance with Alexiadou's (2001) proposal that AspP is the highest extended verbal projection that can be nonminalized.

(53) a. atókwaʔt [Oneida]
b. at-o-kw-ʔt
SRFL-immerse-REV-CAUS
'spoon'
c. waʔutokwaʔtslóhaleʔ
waʔ- u- [at- o- kw- ʔtsl]- ohale -ʔ
FACT- 3.SG.F.AG- [SRFL- immerse- REV- NZLR]- wash -PUNC
'She washed the spoon.'

4.3 Light verb NI in Northern Iroquoian

There is a very small set of verbs in Northern Iroquoian languages that require incorporation of a lexical nominal.[25] These verbs have the same properties as described above. Certain INs require overt nominalizers or more material (such as the semi-reflexive) exactly as described above, and larger nominal expressions (such as those with adjectives) cannot be incorporated. Thus, the size of the IN depends on the lexical root of the IN, not on the verbal root. We call these verbs light verbs for expository purposes. Consider the following examples (Woodbury 2003:110, 635, respectively).

(54) a. waʔęːnáːdeʔ [Onondaga]
waʔ- aʔęn- ade -ʔ
3.SG.NT.AG- stick- exist -STAT
'(It is a) [suspended] pole.'
b. hatcihsiyóh
ha- atcihsR- iyo -ʼh
3.SG.M.AG- friend- be.good -STAT
'He is a good friend.'

The following Oneida (Michelson and Doxtator 2002:255) examples show that the presence of the nominalizer depends entirely on the lexical root of the IN rather than on the lexical root of the verbal complex. Some discussion is required here. The root *o* 'immerse', when combined with the reversative and the semi-reflexive, idiomatically means 'spoon'. The verbal root *iyo* 'good' is a light verb just as in Onondaga and requires incorporation. This root, when combined with the coincident and the dualic idiomatically means 'be half of'. The crucial observation here is that the form of the incorporated element does not depend on the verbal root ('be good' versus 'wash'), but on the lexical root of the incorporated expression ('immerse').

[25] See Barrie (2011) for an extensive discussion on this in Oneida. Note that we distinguish here between those verbs that require incorporation of a true lexical nominal expression from those that are happy with a dummy noun. See Barrie (2011) for details. We also set aside those verbs that require incorporation only when a semi-reflexive is present. See Barrie (2011) and Alboiu and Barrie (2009) for details.

(55) a. tshaʔtewatokwaʔtsliyó [Oneida]
tshaʔ- te- wa- [at-o-kw-a-ʔtsl]- iyo
COIN- DUC- 3.SG.NT.PAT- [SRFL-immerse-REV-NZLR]- be.good
-ˊ
-STAT
'half a spoon.'

b. waʔutokwaʔtslóhaleʔ
waʔ- u- [at- o- kw- ʔtsl]- ohale -ʔ
FACT- 3.SG.F.AG- [SRFL- immerse- REV- NZLR]- wash -PUNC
'She washed the spoon.'

As a brief interim summary, we have seen that Northern Iroquoian incorporates an *n*P (be it a pure nominal, a nominalized VP, or a nominalized AspP). Also we have seen that the incorporator can be either a lexical verb or a light verb. Finally, we have seen that there is no interaction between these two parameters. The internal content of the *n*P does not depend on whether the incorporator is a lexical verb or a light verb.

4.4 On the absence of DP incorporation in Onondaga

In contrast to Ojibwe, Onondaga does not permit incorporation of a noun together with a modifier or a demonstrative.

(56) a. *waʔgogaʔwihägwahnínǫʔ [Onondaga]
waʔ- k- o-kaʔwi-h häkw- a- hninǫ -ʔ
FACT- 1.SG.AG- 3.SG.NT.PAT-taste-STAT bread- JOIN- buy -PUNC
('I bought some/the tasty bread.')

b. waʔkhnínǫʔ neʔ ogáʔwih ohägwaʔ
waʔ-k-hninǫ-ʔ neʔ o-kaʔwi-h
FACT-1.SG.AG- buy-PUNC NE 3.SG.NT.PAT-taste-STAT
o-häkw-aʔ
NPREF-bread-NFS
'I bought some/the tasty bread.'

c. *waʔgnęgęhnínǫʔ
waʔ-k-nękęh-hninǫ-ʔ
FACT-1.SG.AG-this-buy-PUNC
('I bought this.')

4.5 Implications for a Bakerian analysis

The facts above show that Onondaga incorporates lexical roots, with a lexically selected nominalizer (which can be phonologically null), or nominalized verbal constructions—an *n*P in both cases. It does not incorporate larger nominals, such as DP, as seen with Ojibwe. Furthermore, it also has limited light verb incorporation. We present an analysis of NI in Onondaga adopting the parameterized model proposed at the outset of the discussion. We start, though, with a brief discussion of Baker's approach to NI, as it was laid out principally with Northern Iroquoian in mind.

For Baker, although it is a bare root that incorporates into the verb, the IN is nevertheless categorized (see Baker 2003 in particular for a detailed discussion): the IN is

intrinsically a noun. For example, it does not need a nominalizer to turn into a noun. In that respect, Baker's view of categorization is at odds with Marantz's (1997) (Distributed Morphology) and Borer's (2003, 2005a, 2005b) (neo-constructionist view), since on their account the category of an expression is a function of the functional category that takes that expression as a complement. For Baker (2003), on the other hand, the category of an expression is determined by the local configuration of the expression (specifically, whether it has a specifier, or bears an index, or neither).

Baker argues that his view has at least two significant advantages over the Distributed Morphology view and the neo-constructionist view. First, it predicts that category-specific behavior can arise even when there is no sign of any functional superstructure dominating the lexical head; the clearest case in point being incorporation structures. Second, on the assumption that nominalizers are functional heads, a functional head between the incorporating head and the host head would block movement by the Head Movement Constraint and the Proper Head Movement Generalization (Baker 1996:284, 2003:53; see also Li 1990). The definition for this latter principle appears in (57).[26] Since roots are categorized in Baker's view, there is no need for a functional categorizing head, and no violations of the above constraints ensue.

(57) *The Proper Head Movement Generalization* (PHMG)
A lexical head A cannot move to a functional head B and then to a lexical head C.
(Baker 2003:53)

To quote Baker:

> "[. . .] nouns incorporate into verbs in a variety of languages, but always as bare roots; they never carry morphemes that mark definiteness, number, or case—morphemes that they might have picked up by moving through functional categories on their way to the verb." (Baker 2003:306)

The DM view seems to predict, on the other hand, that category-specificity would disappear in the case of NI, i.e. that one would have incorporation of bare roots that are undifferentiated for category. As Baker points out, whereas it is normally roots that incorporate, as opposed to inflected words, it does not appear to be true that those roots show neutralization of category. On the contrary, Baker argues that category-specificity is usually enhanced in these contexts (see Sects. 2.6, 3.6, and 3.9 of his 2003 book).[27]

The problem with Baker's (1988, 1996, 2003, 2009) view of INs as bare roots is that, as should be clear by now, Algonquian permits incorporation of nouns much larger than bare roots. In particular, as seen in Sect. 3, a root can raise to *n* (a functional category) and then to *v* (a lexical category), in violation of the Proper Head

[26] In footnote 2 on p. 269, Baker (2003) entertains the idea that perhaps *n* (or *v*) is not functional, but lexical, in which case there would be no problem for a bare root to head move to *n* and for that complex head to raise to the verb. He concludes, however, that there is a little evidence that category-forming *n*'s or *v*'s are always necessary. According to Baker, in many cases, they are not: on his view, bare roots are categorised.

[27] For instance, Mayali, Nahuatl, and Greenlandic all allow what look like APs to function as direct objects in simple sentences, and they all allow incorporation of direct object nouns. They do not, however, allow the incorporation of "adjectival" roots.

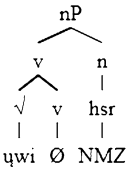
Movement Generalization (PHMG). One possibility would be to parameterize the PMHG so that it holds in some languages but not in others. One could imagine *a priori* that the PHMG (presumably, like other principles) is sensitive to parametric variation. However, given the Borer-Chomsky hypothesis that cross-linguistic variation is restricted to lexical items, we do not follow this tack. It is difficult to imagine how such a parameter could be acquired by the child. Furthermore, it would require us to assume that the PHMG is not in force for the very language for which Baker proposed it, namely Mohawk, since it turns out INs in that language and in Northern Iroquoian are not always bare roots.

Although Baker has examples with such nominalizers in the Mohawk data set of his (1996) book, such structures are not discussed. If we follow his view of NI, however, it becomes difficult to explain how they are possible. It is not conceivable to claim that the noun first adjoins to *n* and then raises to the verb, since this would violate the PHMG (57). If we follow Baker's logic and stick to the constraint in (57), we are forced to conclude that an IN surfacing with a nominalizer raises to the verb via XP movement rather than head movement, since it is impossible for the root to have adjoined to the functional category *n* in the first place. Assuming the PHMG is not active in Iroquoian would be pointless, since the PHMG would not even apply to the language family it was originally designed for. Proposing that *v*, *n* and the like in Iroquoian are lexical rather functional makes the wrong predictions. *v*, *n*, etc. have none of the properties of other lexical items in Iroquoian. For instance, they cannot form the root of verbal or nominal expressions, respectively. Thus, while a priori the PMHG can be parameterized, nothing motivates that move.

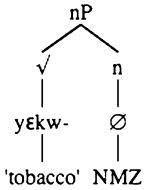
4.6 Iroquoian NI targets *n*P

Focusing back on the data set in (50) and (51), we see that bare roots in Iroquoian are not inherently categorized, since they surface with categorization morphology. Thus, contrary to what Baker (2003) claims, it may well be that bare roots in Iroquoian (INs without a surfacing nominalizer) are categorized not intrinsically but because they are merged with a functional nominalizer that is phonologically empty. In fact, there appears to be a strong correlation in Iroquoian between referentiality and projection of *n* as in Algonquian. Recall that the incorporated light nouns are non-referential and never appear with a nominalizer. Thus, whenever the IN is referential in Iroquoian, it must be the case that an *n*P is incorporated rather than a root (58a). We assume a phonologically null categorizing head in examples such as (58b), giving rise to the appearance of a bare root.

(58) a.



b.



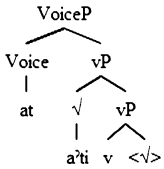
Given that the IN contains both a prefix and a suffix, it cannot be derived by simple head movement (assuming strict left-head adjunction, at least within one and the same language). Note in particular example (59), which contains a denominal verb

(formed with the light verb *ki*, which appears with soups and drinks), which is then deverbalized.

(59) wa$^{?}$ehnegagi$^{?}$tshę́:nya$^{?}$ [Onondaga]
wa$^{?}$- e- [hnek- a- ki- $^{?}$tshR]- ǫny -a$^{?}$
FACT- 3.SG.F.AG- [water- JOIN- LV- NZLR]- make -PUNC
'She made soup.' (Woodbury 2003:529)

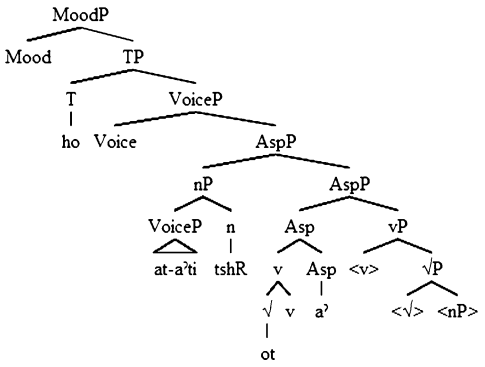
The semi-reflexive is often treated as a middle voice marker.[28] Although a detailed analysis of this morpheme is yet to come, its semantics suggests it originates in the *v*P layer of the clause, perhaps as the head of a VoiceP. Agreement and mood is always prefixal in Northern Iroquoian, while aspectual and valency changing morphology is always suffixal. Given the Mirror Principle (Baker 1988), this suggests that the verb in Northern Iroquoian raises as high as *v*, but remains below VoiceP.[29] Since the voice head is a prefix, it cannot be the case that the string *at-a$^{?}$ti-tshR* is fully formed by head movement. Thus, we posit the structure in (60) for the incorporated element. Crucially, this complex is not a head, but rather an XP.

(60)



As shown in (61), the object in (60) merges with the nominalizer before becoming incorporated into the larger verbal complex. For simplicity the larger verbal complex is shown as head movement. Crucially, as shown in (61), NI can take place only as XP movement.

(61)



Given the XP analysis that we have proposed above, we need to consider why N + Adj incorporation is available in Algonquian but not in Iroquoian. While a full inves-

[28] Lounsbury (1953) first made the comparison between the Northern Iroquoian semi-reflexive and Romance *se*. See also Alboiu et al. (2004) for details.

[29] We do not examine here the syntax of the formation of the entire verbal complex. For such an account that eschews head movement, see Barrie (2011).

tigation of how adjectives fit in to the extended nominal domain is the topic of another paper, we make the following tentative remarks here. Assuming the structure in (12), we would like to suggest that Iroquoian languages do not have direct modification adjectives. Iroquoian languages do not appear to have a distinct class of attributive adjectives (Mithun 1992; Chafe 2012), which would fall under Cinque's direct modifiers. Rather, adjectives are expressed by full verbal predicates, in the form of relative clauses, as shown in (57b).

By contrast, adjectives in Algonquian can be expressed attributively by direct modification (in addition to the other kind). Thus, if we assume the domain of incorporation in Northern Iroquoian is restricted to *n*P then we have an explanation as to why adjectives cannot appear in NI constructions in Northern Iroquoian, but can in Algonquian. Quite simply, if incorporation in Northern Iroquoian involves only a bare *n*P, then adjectives are absent in NI constructions because those languages do not have adjectives that appear at or below *n*P.

4.7 Summary

To summarize Sect. 4, it was shown that Onondaga (*qua* Northern Iroquoian) allow the incorporation of nouns that are bigger than roots. We concluded that Northern Iroquoian languages are parametrically set to allow NI of *n*Ps only, and that both lexical and light verbs can serve as incorporators. We suggested that the absence of adjectives in INs in Iroquoian is due to the lack of adjectives merged below *n*P, the proposed domain of incorporation.

5 Extending the phrasal analysis to other languages with NI

In this section we show that complex INs are fairly common cross-linguistically and that in some cases, they involve INs that include KP and CP. We introduce data from Inuktitut (*qua* Inuit), in Sect. 5.1, and Crow (*qua* Siouan), in Sect. 5.2.

5.1 Inuktitut (Inuit): *n*P, *d*P, and KP incorporation

Many languages with light verb NI exhibit rich morphology on the IN and allow INs to be modified stem-internally. In particular, like Ojibwe, Inuktitut allows *d*P, DP and KP to be incorporated. We discuss each of these possibilities in turn. In Inuktitut, the modifier *biili* 'big' modifies the IN inside the stem, as shown in (62). According to Sadock (1980:316): "modification of incorporated nominals is perfectly regular in Greenlandic". This is, on our view, assumed to be incorporation of a *d*P.

(62) Biilersualiorsimavoq [Inuktitut]
biili- suaq- lior -sima -voq
car- big- make -PST -3SG.S
'He has made a big car.' (Sadock 1980:303)

In some dialects of Inuktitut it is also possible for INs to bear possessive marking (*-si-*), indicating incorporation of a DP is involved.

(63) angusisarpoq [Inuktitut]
angu- si- sar -poq
father- POSS- ressemble -IND.3.SG.S
'He resembles his father.' (Sadock 1980; Denny 1989:239)

In some dialects of Inuktitut (Qamani'tuarmiutut), it is even possible to incorporate *wh*-phrases
(64a) and proper names (64b), clearly DP elements.

(64) a. Suna-tuq-pin? [Inuktitut]
Suna- tuq- -pin?
what/something- consume- -INTERR.2SG
'What are you eating?'
b. SherriLee-ngujaaq-tuq.
SherriLee- ngujaaq- -tuq.
Sherrilee- look.like -IND.3SG
'She looks like Sherri Lee.' (Johns 2007:560)

In Inuktitut, it is also possible to incorporate nouns with case and number marking (Sadock 1980; Fortescue 1984; Denny 1989; Gerdts 1998). In (65), the noun carries allative case *mut* 'to' and third person singular number *a*. (65) is a case of KP incorporation (see also Compton and Pittman 2010 and Compton 2013).

(65) palasip illuanukarpoq
palasi-p illu- a- nu- kar -poq
priest-REL house- 3.SG- ALL- go -IND.3.SG.S
'He went to the priest's house.' (Gerdts 1998:98)

Baker (2003) argues that, in allowing locative incorporation into a verb, examples such as (65) are the exceptions that prove the rule. On his view, a functional element like a preposition cannot incorporate into a lexical element like a verb and more generally that locative or obliquely marked nouns do not incorporate into verbs. But there are many such cases in the literature (see Sect. 6.1.2). Once we acknowledge the numerous facts showing INs are morphologically complex, this kind of examples is no longer surprising.

Consider now the example in (66). Here it is the modifier that is morphologically united with the verb, not the head in (apparent) violation of the Head Movement Constraint.

(66) Illumut angisuumutkarpoq [Inuktitut]
Illu-mut angisuu- mut- kar -poq
house-ALL big- ALL- go -IND.3SG.S
'He went to the big house.' (Sadock 1985:423)

According to Baker (2003:308), "these facts suggest that verb like *-kar* do not trigger incorporation in the sense of syntactic head movement at all. Rather, they are more like clitics—morphophonologically bound elements that attach to the immediately preceding word in the PF component." On this view, the Proper Head Movement Generalization in (57) is not relevant to examples such as (66). The problem is that such

cases are not rare. Shifting Inuktitut NI to PF is ad hoc. Inuktitut NI shares many properties with Iroquoian's NI: modifier stranding, restrictions on what can incorporate, low scope interpretation, and even the support of discourse anaphora (Bittner 1994; van Geenhoven 1998; Johns 2007).

5.2 Crow (Siouan): *n*P, *d*P, DP, and CP incorporation

Incorporation of complex nouns is widespread and is not limited to Algonquian, Iroquoian or Inuit languages. In Crow, a Siouan language, the target of incorporation can be *n*P, *d*P, DP, and most spectacular of all CP. This is exactly what our analysis predicts. Consider first *n*P incorporation (67). This is a very productive process and thus very common with English borrowing as illustrated in (68).

(67) a. iisáakshe íiliia daxxóxx-uu-k [Crow]
young.men tipi.poles peel-PL-DECL
'The young men peeled the tipi poles.'
b. iisáakshe íilii-daxxóxx-uu-k
young.men tipi.poles-peel-PL-DECL
'The young men were peeling tipi poles.' (Graczyk 2007:280)

(68) a. ak-ice-iiwaaiaschilee-sh kala-híi-k [Crow]
REL-ice-sell-DET now-arrive-DECL
'The man who's selling ice has arrived.'
b. wine- isshii -ak
wine- drink -SS
'He's drinking wine.' (Graczyk 2007:280)

It is also possible in Crow for possessed noun phrases to be incorporated. This is illustrated in (69). Again, possessed noun phrases are DPs; clearly bigger than roots.[30]

(69) a. d-áasuu-lia-waa-(a)k [. . .] [Crow]
2.POSS-house-make-1A-SS
'I will make a house for you [. . .]' (Literally: 'I will make your house.')
b. hehtáa baattáche aák b-iíttashtee-lit-dia-laa-lak
but rawhide with 1.POSS-shirt-APPROX-make-2A-COND
'but if you make a shirt for me out of rawhide' (Literally: 'but if you make my shirt out of rawhide')
(Graczyk 2007:282)

It is also possible for whole CPs to incorporate as shown by (70).[31] Here, the whole relative clause incorporates into the verb.

[30]The possessor has been incorporated along with the possessed nominal rather than having been stranded. Second person (possessive) is not mere agreement, it is the possessor. There is no stranding possible.

[31]We know for certain that the entire relative clause has incorporated rather than the rightmost morpheme or the head, stranding the remainder. The structure of the relative clause is such that there is no head: we are dealing with a headless relative. We know it is a relative clause because of the prefix REL. What has incorporated is clearly the part of the relative *without* the head (which would be 'place' or 'somewhere').

(70) a. [ala-húu]-alaaxta-k [Crow]
REL-come-not.know-DECL
'He didn't know where he came from.'
b. [am-m-ihchiss-úu]-waa-chiil-uu-k
REL-1A-rest-PL1A-look.for-PL-DECL
'We're looking for a place where we can rest.' (Graczyk 2007:281)

Finally, It is also possible in Crow for modifiers to incorporate as illustrated by (71a). (71b) shows that the modifier need not incorporate: it can also be an independent word.[32]

(71) a. baláxii-uuwate kúh shoop-dútchi-k [Crow]
weapon-metal PRO four-take-DECL
'He also took four guns.' (Graczyk 2007:287)
b. Uá shoopá-m dáawiia dée-hche-k
his.wives four.DS three go-CAUS-DECL
'He had four wives, he divorced three of them.' (Graczyk 2007:289)

To summarize: we have seen that the incorporation of complex nouns is widespread in polysynthetic languages. In addition to Algonquian and Iroquoian, we have now introduced examples from Siouan and Inuit.

6 Implications of the phrasal NI analysis

In this section, we evaluate the claim that head movement is still needed for NI and compare the head movement analysis with the phrasal movement analysis. First, we evaluate Baker's (2009) claim that head movement is still needed for NI, examining properties of NI in Northern Iroquoian and Mapudungun and reviewing his five empirical arguments (NI proceeds by left- or right-adjunction, only the noun root incorporates, only the theme or direct object incorporates, the incorporated and non-incorporated forms are semantically equivalent, modifiers can be stranded). Second, we show that in Ojibwe there are no Government Transparency Corollary (GTC) effects and propose that for Iroquoian these effects can be derived independently. Third, we address Baker's (2012) head movement account of the pseudo noun incorporation (PNI) facts in Sakha and Tamil. Fourth, we revisit Roberts' (2010) recent Agree account of head movement and its relevance for NI. Finally, we address the implications our proposal has for "wordhood" in polysynthetic languages.

6.1 Revisiting Baker's (2009) head-movement analysis

Although head movement is problematic under current theoretical assumptions about phrase structure, it is nevertheless the mechanism that still currently dominates syn-

[32] We know for certain that the modifier in (71) is really a modifier rather than the head of a partitive phrase (i.e. of the guns four). In a head final language, this is exactly what a partitive phrase with such semantics would look like (thanks to Reviewer #1 for pointing this out). This is not implausible, but nothing in the grammar of Crow we consulted suggests this is on the right track and considering the overwhelming evidence that modifiers can incorporate in other NI languages, we take modifier incorporation to be entirely natural: it is the null hypothesis.

tactic analyses of NI. Baker (2009), in particular, is adamant that head movement is still needed in the grammar precisely because of NI and especially because of the properties shown by NI in languages such as Mohawk and Mapudungun (a language of uncertain genetic lineage). Baker (2009) discusses the following five empirical points in support of his claim that head movement is still needed to account for NI. In this section, we review each point in turn.

(72) a. NI proceeds by left- or right-adjunction.
b. Only the noun root incorporates.
c. Only the theme or direct object incorporates.
d. The incorporated and non-incorporated forms are semantically equivalent.
e. Modifiers can be stranded.

6.1.1 NI proceeds by left- or right-adjunction

There is a strong, cross-linguistic tendency for the IN to precede the verbal root (Caballero et al. 2008). However, in Mapudungun, the IN follows the verb rather than precedes it, as the following example illustrates.

(73) el-che-me-a-n Temuco. [Mapudungun]
leave-people-DIR-FUT-1.R Temuco
'I am going to leave people in Temuco.'
(Harmelink 1992:131, translation from Spanish is ours).

Baker et al. (2005) conclude from the Mapudungun data that NI can proceed either by left-adjunction or right-adjunction. Such an enrichment to the mechanism of structure building is not preferred to a more minimalist system (in the case of lexical verb NI in Algonquian, we postulated *v*P movement).

Consider also the interaction between NI and other kinds of morphology. In Mapudungun, certain kinds of morphology low in the extended VP domain can intervene between the verb root and the IN (Smeets 2008:151). Specifically, the verbal stem that hosts the IN can appear with a causativizer (*-el* in (74a) and (74b)), a transitivizer (*-tu* in (74c)), or a locative (*-pa* 'hither' in (74d)). Examples from Smeets (2008).

(74) a. llüka-el-ka-che [Mapudungun]
become.afraid-CAUS-FACT-person
'to frighten people'
b. trap-el-akucha
fit-CAUS-needle
'breast decoration for women'
c. are-tu-ketran-e-n-Ø
borrow-TR-wheat-IDO-1.SG.SUBJ-DS
'You borrowed wheat from me.'
d. ru-l-pa-nütram-Ø
pass-CAUS-HITH-conversation-VBLZ
'to interpret'

These are all elements that, by and large, are associated with *v* or with functors nearby (Alsina 1992; McGinnis 2001; Pylkkänen 2008; Zubizarreta 1985). They seriously call into question the right adjunction analysis proposed by Baker.

6.1.2 Only the noun root incorporates

Crucially for Baker, the incorporated noun in NI constructions is bare. In many cases, this is indeed what we observe. Baker offers numerous illustrations of this point for Mohawk, and Onondaga demonstrates this point further. However, as we saw in previous sections, in many other cases INs are bigger than roots.

Interestingly, Mapudungun does allow the incorporation of compound nouns and nouns modified by an adjective or reduced relative clause. The following examples, from Harmelink (1992:133), show that INs in Mapudungun can be as large as *d*P, i.e. they involve a [modifier-noun] sequence.[33]

(75) a. ngilla-kurü-kal-ufisa-me-a-ymi ? [Mapudungun]
buy-black-wool-sheep-DIR-FUT-2.R
'Are you going to buy [black] sheep's wool?'
b. adkintu-we-ngillan-mansun-kiyaw-i
care-recently-bought-ox-go-3.R
'S/he is caring for a recently-bought ox.'
c. wiñam-we-katrün-kachilla-me-a-ymi
cart-recently-bought-wheat-DIR-FUT-2.R
'You are going to look for recently-bought wheat in the cart.'

The following example is also found in Baker and Fasola (2009:606).

(76) Ngilla-küme-pulku-a-n [Mapudungun]
buy-good-wine-FUT-1.SG.SUBJ
'I will buy good wine.'

Harmelink (1992:133f) offers the following comment on these forms (translation ours):

> No se sabe cuán productivo es este tipo de incorporación en el mapudungun; en todo caso, no se espera un alto nivel de productividad.
>
> [It is unknown how productive this type of incorporation is in Mapudungun. In any case, one does not expect a high degree of productivity.]

Although Baker (2009) and Baker et al. (2005) state that the IN in Mapudungun cannot be modified, the comments from Harmelink (1992) indicate that modified INs, though not fully productive, are nevertheless attested. Baker (2009) goes on to claim that example (76) "proves" that the compound *küme-pulku* ('good wine') is inserted as a head since Mapudungun does not incorporate phrasal material. We note further that NI is typically never fully productive in any language. There are always

[33] Harmelink's original Spanish translation of the Mapudungun sentence in (75a) is '*¿Va a ir a comprar lana de oveja?*' with no mention of 'black'.

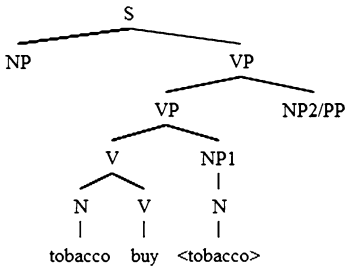
lexical exceptions in many areas of the grammar. Thus, we do not wish to exclude examples such as those in (76) above simply because they exhibit lower productivity than the non-modified instances of NI. In addition to permitting modified INs, Smeets (2008:150) observes that Mapudungun also allows complex verbal stems that consist of a verbal stem in combination with a nominal stem, as in (77). This leads to the conclusion that Mapudungun NI is not restricted to N roots, pace Baker.

(77) [$_{\text{Vstem}}$ wenüy-Ø-ka]-[$_{\text{Nstem}}$ che-Ø] [Mapudungun]
friend-VBLZ-FACT-person-VBLZ
'to make friends with people'

6.1.3 Only the theme or direct object incorporates

Baker is correct, of course, in claiming that goals and agents cannot undergo NI. This has been observed by many researchers. Within the head movement theory of Baker (1988), the restriction of NI to themes followed from independently motivated principles: the Uniformity of Theta-role Assignment Hypothesis (UTAH), and the Head Movement Constraint.[34] UTAH states that theta-roles are assigned in specific positions. Themes are merged as sisters of V, agents in Spec-TP (this predates the VP-internal subject hypothesis). Neither agents, nor indirect objects, nor adjuncts are candidates for NI because they are not the closest head that can raise to the verb. The theme is always the closest head that can incorporate. To see how a Bakerian analysis works, consider the representation in (78). Suppose NP_2 corresponds to the phrase (*for*) *his friend* (with the benefactive marked on the verb, rather than by a preposition as in English) or that the PP corresponds to *from the shop*. It is not possible for *friend* or *shop* to be incorporated because they are not the closest head available. Only the noun *tobacco* in (78) is close enough to the verb to incorporate.

(78)



Baker uses this putative restriction of NI to direct objects to bolster his head movement analysis. Head movement is constrained by the Head Movement Constraint (Travis 1984), which holds that a head can target only the immediately higher head for movement. By most accounts, the verb and direct object are sisters, thus V is the head immediately higher than the object N. XP movement, on the other hand, is not so locally constrained. Thus, if NI proceeds by XP movement, Baker argues, some mechanism would be needed to ensure that only the direct object NP1, and not the indirect object NP2 undergoes NI.

[34] In fact, the Empty Category Principle (ECP).

However, Baker's claim that only the theme or direct object can incorporate is false. The incorporation of elements other than the theme or direct object has been described in numerous languages with NI, including Northern Iroquoian languages (Mithun 1984, 2004; Spencer 1995; Muro 2009; Barrie and Li 2012). Specifically, instruments and locations can often be incorporated as can adverbs. Example (79) shows an incorporated path and instrument in Onondaga (Woodbury 2003:282, 928, respectively). Example (80) shows the incorporation of a phrasally complex path (G.W., N.C., speakers). In Algonquian, it is also possible to incorporate adjuncts, as shown by (81) for Ojibwe, as well as instruments, locatives (Mellow 1989) and also possibly agents (Drapeau 2008 for Innu).[35]

(79) a. honathahidákheˀ [Onondaga]
hon- at- hah- itakhe -ˀ
3.PL.M.NOM- SREFL- path- run -PUNC
'They are walking on a path.'

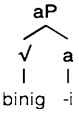
b. waˀhageˀnhyayę́hdaˀ
waˀ- hak- ˀnhya- a- yęht- aˀ
FACT- 3.SG.M.AG:1.SG.PAT stick- JOIN- hit- PUNC
'He hit me with a stick.'

(80) waˀthaˀsehdaˀestaˀ
waˀ-t-ha-[ˀse-ht]-a-ˀest-aˀ
FACT-DUC-3SGM.AG-[drag-CAUS]-JOIN-run-PUNC
'He ran into a car.'

(81) gii-binigi-bootaagewag niw waabi-mdaamnan [Ojibwe]
gii-binigi-bootaagew-ag niw waabi-mandaamin-an
PST-quickly-grind-3PL that white-corn-OBV
'They quickly ground up the white corn.'

We assume Ojibwe adverbs are phrasal: they consist of a root and a category-defining *-i* (the most common ending for this category), which Piggott and Newell (2007) identify as the exponent of derivational little-*a*.

(82)



In these cases, the incorporated adjunct is a preverb, but on our view, as already argued, it is incorporation all the same. Generally speaking, it is always possible in Algonquian for adverbs/adjuncts to appear either in a preverb position (outside the stem) or in an initial position (inside the stem). See, for example, Bloomfield (1946), for Central Algonquian; Goddard (1988) for Meskwaki; Goddard (1990), Dahlstrom (1991) for Plains Cree. In Ojibwe, while stem-external (phrasal) adjunction is marked

[35] Adverb incorporation has been shown for Greek (Rivero 1992; Alexiadou 1997) and Chukchi (Spencer 1995).

by *-i*, stem-internal (root) adjunction is marked by the absence of *-i* on the modifier, as in (83).

(83) a. bimaashi
bim-aashi
along-sail
'He/she sails along.'

b. piitaapi [Ojibwe]
piit-aapi
to.a.certain.extent-laugh
'He/she laughs to a certain extent.'

(82a) contains a directional root (*bim* 'along') while (82b) contains a relative root. Roots as initials in Algonquian are definitely part of the stem. They can specify manners (quickly, slowly, accidentally), qualities, actions, locations, etc. (Valentine 2001).[36] These must be cases of root-root merger (for example, *bim-* appears without final *-i*). More generally, we conclude that, pace Baker, NI is not restricted to direct objects, but may also target adjuncts.

6.1.4 The incorporated and non-incorporated forms are semantically equivalent

Baker's fourth empirical point is concerned with the semantic properties of NI constructions. He challenges the notion that the IN is obligatorily interpreted as a narrow scope (as argued by van Geenhoven 1998) by showing that this is not the case for Mapudungun. He offers the following example as evidence. The IN is said to be interpreted as definite only and thus with wide scope (this example also shows that the IN is referential and can support discourse anaphora).

(84) Juan ngilla-pullku-la-y Iñche ngilla-fi-ñ. [Mapudungun]
Juan buy-wine-NEG-IND-3SUBJ.SG I buy-3O-IND1SG
'Juan didn't buy the wine. I bought it.' (Baker 2009:159)

Crucially, for Baker's arguments to go through, it is necessary to show that this example *cannot* be interpreted as 'Juan didn't buy any wine. I bought some.' However, elsewhere Baker claims that 'overall, INs in Mapudungun can have the range of readings that INs can have in Mohawk' (Baker, Aranovich and Golluscio 2005:146) with the idea presumably that an IN in Mapudungun *does* take narrow scope with respect to negation, as in (85).

(85) Mapuche nie-kawell-la-y-ngün [Mapudungun]
Mapuche have-horse-NEG-IND.3pS
'The Mapuche do not own horses.' (Baker et al. 2005:145)

Although INs in Mapudungun play a role in discourse, it is also the case that 'INs can be interpreted as generic NPs with no particular reference' (Baker, Aranovich and Golluscio 2005:145). Thus, here clearly, the IN is interpreted with narrow scope.

It is clear from the Mapudungun facts that an IN can introduce a discourse referent, as has been shown for Algonquian and Iroquoian, and the semantic facts that Baker discusses actually bolster the claim that the IN is an XP rather than a head, under the assumption that a bare head cannot be referential.

[36] Goddard (1988, 1990) uses the term "preverb bumping" to refer to this widely attested phenomenon.

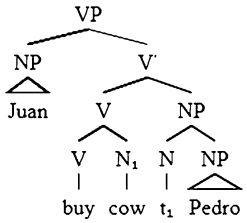
6.1.5 Stranding of modifiers

Baker's fifth empirical point revolves around the concept of stranding. An example appears in (86). He shows that possessor stranding in Mapudungun is a disguised applicative or ditransitive (Baker et al. 2005; Baker 2009). He uses this conclusion to argue against van Geenhoven's (1998) analysis in which the IN is base generated in its surface position.

(86) Juan ngilla-waka-fi-y Pedro [Mapudungun]
Juan buy-cow-3.O-INDIC.3.S. Pedro
'Juan bought Pedro's cow.'

He offers the structure in (87) for possessor stranding.

(87)



Using this structure, he also suggests that Massam's (2001) PNI analysis fails to account for the Mapudungun facts. If simple V + NP adjacency accounts for incorporation, Baker conjectures, then how does the possessor come to be separated from the noun? There are many questions surrounding Baker's structure, however. There are reasons to believe that possessors are not simply complements to N, but rather involve a richer structure, and are introduced higher up in the DP (Szabolcsi 1983; Alexiadou 2002; Tomioka and Sim 2007). Although the details are still in dispute, what is clear is that the simple structure of possessed nominals presented by Baker is likely not correct. Assuming a more articulated nominal projection, a more reasonable proposal is that in the NI construction in (86) the direct object is merged as a deficient or 'partial' XP (i.e. not a full DP). This deficiency triggers NI. The separation of the possessor is straightforward. The possessor DP requires Case, which would normally be supplied by a DP-internal functor responsible for genitive Case. Since the higher extended DP projections are absent, the possessor is free to usurp accusative Case from *v*. Also, since the direct object is not a full DP, it does not require Case. With these assumptions, the problems that possessor stranding raises for a PNI or remnant movement analysis evaporates (see Barrie 2015, for more details).

To sum up, there are problems with the arguments Baker (2009) puts forward in favour of a head movement account of NI. First, on conceptual grounds, it is unnecessary to permit both left- and right-adjunction to account for the linearization of INs. Second, in Iroquoian, INs are not bare roots but complex elements that become referential in virtue of the nominalizers they surface with. Third, NI is not restricted to certain arguments, and it is not in fact restricted to arguments, but is possible with adjuncts. Fourth, the fact that INs are referential in the languages under study is expected under an XP movement view of NI. Finally, it was shown that it is possible to account for modifier stranding on an XP movement view of NI after all.

6.2 The (ir)relevance of the Government Transparency Corollary (GTC)

One way in which the head-movement account differs from the phrasal analysis of NI relates to what have come to be known as "GTC effects".

(88) *The Government Transparency Corollary* (GTC)
A lexical item which has an item incorporated into it governs everything which the incorporated item governed in its original position. (Baker 1988:64)

To illustrate its effects in Mohawk, consider the examples in (89). In (89a), the noun is independent from the verb while in (89b) it is incorporated into the verb.

(89) a. Ka-rakv ne [sawatis hrao-nuhs-aʔ] [Mohawk]
3N-white NE John 3M-house-SUF
'John's house is white.'
b. Hrao-nuhs-rakv ne [sawatis t]
3M-house-white NE John
'John's house is white.' (Baker 1988:65)

Baker notes that there is a shift in verbal agreement between (89a) and (89b). In (89a) the verb has neuter agreement matching its thematic argument 'house' ('house' agrees with 'John' third masculine—3M). In (89b) the verb has masculine agreement, matching the possessor of its argument 'John' rather than neuter that is associated with 'house'. Supposing that the verb can only agree with an NP that it governs, then the GTC accounts for the agreement shift. In the unincorporated structure the verb does not govern the possessor and hence cannot agree with it. After incorporation, however, the verb does govern the possessor and agreement between the two becomes possible. The possessor comes to have a canonical property of Mohawk objects as a side effect of incorporation. Michelson (1991), however, argues persuasively that the possessor in (88b) is a direct dependent of the verb, thus obviating the need for the GTC (not to mention Government itself) to explain the agreement facts.

In Ojibwe, possessor stranding constructions show GTC effects. Consider (90). In (90a), before NI, the verb agrees with 'food' in inanimacy (*miijim* is inanimate). Since the verb is transitive inanimate, there is no third person agreement on the verb as is the case for transitive animate verbs. When 'food' undergoes incorporation, as in (90b), the verb becomes intransitive but remains inanimate, thus still in agreement with 'food' rather than 'John' who is animate.

(90) a. Ngii-naadin Zhaabdiis miijimim [Ojibwe]
n- gii- naad -in Zhaabdiis miijim- im
1- PST- fetch- -VTI John food- POSS
'I fetched John's food.'
b. ngii-naajimiijimime Zhaabdiis
n- gii- naad -i -miijim -im -e Zhaabdiis
1- PST- fetch -EPEN food -POSS -VAI John
'I fetched John's food.'

These data can be taken to confirm our analysis of Ojibwe: head movement is not involved. But their absence could be due to another factor. After all, GTC effects are attested in Iroquoian; however, we have seen that Michelson (1991) has an alternative explanation for these facts that does not rely on the GTC.

6.3 Revisiting Baker's (2012) head movement analysis of pseudo NI

Baker's (2012) account of pseudo noun incorporation (PNI) also relies on head movement. PNI involves a verb and a reduced noun in juxtaposition (Mithun 1984; Massam 2001). The object noun is often non-specific and caseless and is usually strictly adjacent to the verb. According to Baker (2012), PNI is possible with objects/themes but not with other arguments; he takes this to be evidence that PNI is NI. To illustrate consider the examples in (91) and (92) from Sakha and Tamil. In both languages, a caseless noun is interpreted as non-specific, and must be strictly adjacent to the verb, (91). And in both languages, a case-marked noun is construed as specific, and need not be strictly adjacent to the verb, (92).

(91) a. Erel kinige atylas-ta [Sakha]
Erel book buy-3SG.S
'Erel bought a book/books.'

b. Maala veegamaa pustagam padi-cc-aa [Tamil]
Mala quickly book read-PST-3FS
'Mala read a book/books quickly.' (Baker 2012:5–6)

(92) a. Erel kingie-ni atylas-ta [Sakha]
Erel book-ACC buy-PST.3SG.S
'Erel bought the book/a certain book.'

b. Maala veegamaa anda pustagatt-e padi-cc-aa [Tamil]
Mala quickly the book-ACC read-PST-3F.S
'Mala read the book quickly.' (Baker 2012:4)

Similar facts in Turkish have already been reanalyzed as PNI (Öztürk 2005, 2009). This contrasts with Kornfilt (2003) and others (Mithun 1984; Knecht 1986; Nilsson 1986), who have proposed head movement of caseless/non-specific nouns to the verb (to boost her NI analysis, Kornfilt 2003 argues that once the noun has incorporated into the verb, GTC effects are visible, see Sect. 6.2 on GTC effects).

Baker's (2012) account of Sakha and Tamil caseless nouns proceeds as follows. The noun + verb sequence is interpreted as a single semantic predicate at LF (Dayal 2011), and this complex predicate formation requires complex head formation, which is satisfied by having the noun undergo head movement to the verb. When the noun surfaces with a modifier, the modifier is left behind but must be adjacent to the noun.

(93) I [$_{VP}$ [$_{NP}$ yellow flower][$_{V}$ flower-pick]]
|_____| |_____| |____|
adjacency identity adjacency

Baker (2012) argues that the strict adjacency between the verb and the noun arises from a modified interpretation of Nunes' (2004) theory of linearization.

(94) If a chain consists of more than one link, then at PF:
  a. Delete the copy that has more features as a result of feature checking, if any (Nunes 2004).
  b. If one copy is part of a complex morphological object, delete the other copy (compare the so-called Stray Affix Filter).
  c. Otherwise, all the ordering statements relevant to both copies must be respected, while still uttering the lexical item only once. (Consequence: the movement must have been string vacuous.)

The condition in (94c) is strange in light of Nunes' discussion of *wh*-copy constructions in German and other languages as in the following German example (Fanselow and Mahajan 1995).

(95) Wen denkst Du wen sie meint wen Harold liebt?
who think you who she believes who Harold loves
'Who do you think that she believes that Harold loves?'

Here, more than one copy is spelled out at PF. Nunes (2004) claims that it is precisely only when head movement is available to the *wh*-item that multiple copies can be spelled out. This is based on the observation that *wh*-copy constructions are not available to elements that are clearly phrasal such as *wessen Buch* ('whose book'). Nunes' argument goes as follows. The LCA is a constraint on the order of the terminal elements in a syntagmatic representation. It has nothing to say, however, about the order of the internal elements within a terminal. Thus, if *wen* ('who') raises by head movement forming part of a complex head (i.e. a complex terminal), it is not subject to the LCA. Since it is not subject to the LCA, multiple appearances of this item are not problematic for linearization at PF. This is exactly the type of movement that Baker argues takes place in the PNI examples. That is, the nominal head undergoes head movement to the verb to form a complex predicate. Thus, Baker's (94c) is clearly at odds with the spelling out of multiple copies in *wh*-copy constructions.

Baker's claim that the nominal portion of the PIN must be adjacent to the verb faces problems in light of the following Niuean data (Massam 2001:159–160). In (96a), an entire coordinate NP has undergone PNI and in (96b), a modified noun has undergone PNI. It is not clear how Baker's analysis, which permits only bare Ns to undergo PNI, would handle these facts.

(96) a. Ne kai sipi mo e ika mitaki a Sione [Niuean]
PST eat chip COM ABS fish good ABS Sione
'Sione ate good fish and chips.'
  b. Fai tolili lolo foki nī au ne toe
have residue oil again EMPH I NFUT left
'I have very little oil left.'

6.4 Revisiting Roberts' (2010) Agree analysis of NI

While Roberts (2010) does not deny that there are cases of PF head movement (e.g., subject procliticization in French, Kayne 1983; Rizzi and Roberts 1989), his proposal

is that many cases of head movement are syntactic. According to him, head movement is simply incorporation and in turn incorporation is parasitic on the (well-known) Agree relation. His account is particularly relevant for us because it gives not only a detailed account of NI but it argues that head movement *is* incorporation.

After having shown that head movement can have interpretive effects, Roberts (2010) introduces his syntactic account of head movement. His proposal is that the operation applies where the Goal of an Agree relation is defective and that all is needed for head movement to occur is precisely this configuration: head movement is a reflex of a defective Goal ("What is the trigger for cliticization? Nothing other than Agree." Roberts 2010:59). The notion of 'defective' is defined as follows.

(97) A goal, G, is defective iff G's formal features are a proper subset of those of G's Probe, P. Roberts (2010:62)

Roberts (2010) reviews cliticization in detail. Clitics are defective in that they do not have a label distinct from their host. Non-distinctiveness means that the Goal's features are a proper-subset of the Probe's features.

Roberts (2010) extends his proposal to NI. On his view, NI is a type of cliticization (he points to the comparison made in Baker 1988 between NI and *ne*-cliticization). The main idea is that INs are defective: they have an *n*P layer but no inflectional layer and no D layer. The derivation for NI goes as follows. Inside *n*P, the root N incorporates with *n*, in clear violation of (97), but in agreement with Marantz (2001). V incorporates with *v**. The step of NI is then incorporation of *n*-N into *v**, which proceeds as follows. *v** has a φ-set (due to rich object agreement). These features cannot probe φ and so must probe *n*. *v* has also a D feature. D is a type of N feature, so *v** and *n*-N are not featurally distinct. This is shown in the following structure. Note that HM is not shown in the traditional sense since Roberts argues the output of Agree derives the HM effects.

(98) $[_{v*P}\ v^*\text{-}\{D, V, u\varphi\}\ [_{VP}\ V\ [_{nP}\ n\text{-}\{N\}\ [_{NP}\ N]]]]$

The reason why *v* has a D feature is because polysynthetic languages are radically pro-drop (subject and object pro-drop). According to Roberts, rich agreement correlates with a D feature on T. In languages with rich agreement T has a D feature just where it has a complete set of person-number features; in languages where person-number features are only partially specified, T may have such features, but no D feature.[37]

On Roberts' (2010) analysis, head-to-head relations do involve "complementary" ("matching") features and head movement has semantic effects. However, although there are cases of head movement that involve excorporation, the type Roberts (2010) describes involves incorporation. C-command: incorporation is parasitic on the Agree relation, when *n't* cliticizes to T the negative feature becomes a feature of T, and when T to C raising occurs the negative feature of T becomes a feature of C thanks to incorporation: no modification of the simplest definition of c-command is required: all that is required is that C probes T (Roberts 2010:20). The problems with the Extension condition are solved since there is no actual movement, only Agree.

[37] According to Roberts (2010), the null-subject parameter: T is +/− **un**interpretable D (pace Holmberg).

There are many problems with Roberts' (2010) account: most significantly for the current discussion, there is plenty of evidence that INs are not defective. When NI is discussed, it is often the case that examples with bare roots (and direct objects or themes) are given, but in many cases/in many languages the IN is much larger than a bare root and incorporates with additional layers of derivational and inflectional morphology. Moreover, in many languages, adjunct incorporation is possible (including Northern Iroquoian). These facts conspire to cast serious doubt on the view that only direct object/themes that are bare roots can incorporate. In summary, the claim that INs are defective is not correct.

6.5 Implications for phrasal attachment

One question that arises from our proposal is what triggers the morpho-phonological dependencies that we see in Ojibwe words in other so-called polysynthetic languages. We propose that the agglutinating property of languages with NI originates from an independent property of the incorporating verbs involved: the *v*P in Algonquian and the CP in Northern Iroquoian form a single word at PF. Following Branigan et al. (2005) we take the domain of syllabification in polysynthetic languages to be larger than the Prosodic word and to be equivalent to a Phonological phrase. There is thus parametric variation in word domain size (which means that phases do not necessarily match syntactically and phonologically—see Sect. 2.1). Using Branigan et al.'s (2005) formulation of the parameter: either the word is equivalent to a Pwd (isolating languages) or the word is equivalent to a P-phrase (polysynthetic or agglutinating languages).

Investigating further the phonological properties of Ojibwe words (and Algonquian in general) is nevertheless beyond the scope of this paper. Let us simply mention that there is evidence that affixes are in fact (phrasal) clitics in Ojibwe (and perhaps Algonquian, more generally). Tense markers, modifiers, etc. are clearly all (phrasal) clitics: they are hyphenated in writing and are never part of the core verbal stem. Moreover, there is evidence that prefixal agreement in Algonquian languages is procliticization (Halle and Marantz 1993; Piggott and Newell 2007) and there is evidence that (some) suffixes are cases of encliticization (Déchaine 1999).

On this view, polysynthesis is not a macroparameter. While it has been popular to build words in polysynthetic languages in the syntax via head movement (on this view, polysynthetic languages are just like non-polysynthetic languages, the difference is that the former have simply more head movement than the latter), we view the polysynthetic properties of such languages as a phonological property: words in "polysynthetic" languages are P-phrases rather than Prosodic words. Polysynthesis thus turns out to be an epiphenomenon:

> "[…it] is at best a descriptive term for a constellation of surface properties which reflect the convergence of independent factors—some syntactic and some prosodic—whose net effects is to derive complex "words". To the extent that this term obscures structural similarities across language families, its theoretical currency is burdensome." (Déchaine 1999:69).

This view is gaining ground in the literature (see Compton and Pittman 2010; Compton 2013) for Inuit and Dyck (2009) for Cayuga.

7 Conclusion

On the basis of data from Algonquian and Iroquoian (but also Siouan and Inuit) this paper has argued that NI is best viewed as phrasal rather than head movement. Head movement has long been used to explain NI and while head movement might still be needed for other constructions (although its status in current theory is problematic for many), our conclusion is that it is not necessary for NI. If it turns out that nothing in the grammar requires head movement, then NI is no longer an exception to the generalization put forward by Chomsky (2001) to the effect that head movement is not part of core syntax. The empirical observations to take home are that INs are, cross-linguistically, much bigger than previously thought. This is true in the very languages discussed by Baker (1988, et seq.), including Mapudungun, and this challenges the empirical basis for any head-movement account.

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