Noun Incorporation

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1 Introduction

Noun incorporation (NI) is the term used for morphosyntactic constructions in which a noun (N) or noun phrase (NP) forms a "close unit" with the verb (V). The incorporated noun (phrase) is smaller in size than other, independent arguments, which are typically determiner phrases (DPs). It also forms a closer unit with the verb than if the verb were simply combined with an argument or adjunct in

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the usual way. The smallness and closeness typical of NI have ramifications for morphosyntax, phonology, and semantics.

By way of illustration, consider these examples from Pohnpeian (Ponapean), an Oceanic language of Micronesia. In the transitive sentence (1), the verb *perek* 'unroll' occurs in its transitive form, followed by the direct object DP *lo(h)s* 'mat', which is inflected with the demonstrative modifier *-o*.[1]

(1) Pohnpeian
I pahn pereki lohs-o.
I will unroll.TR mat-DEM
'I will unroll that mat.'
(Rehg 1981, 212)

In the object incorporation sentence (2), the verb has combined with the object noun to form the complex verb *perek-los*. Within this complex verb, *perek* occurs in the "combining" form, not the transitive form, and *lo(h)s* cannot be inflected with the demonstrative modifier.

(2) Pohnpeian
I pahn perek-los.
I will unroll-mat
'I will mat-unroll.'
(Rehg 1981, 212)

The complex verb in (2) patterns like other morphosyntactic verbs and other phonological words. Semantically, it denotes a general, "nameworthy" activity (see n. 10). As Rehg says:

> In sentence [(1)], the action that is being engaged in is one of unrolling. What is being unrolled are mats, as opposed to sheets, blankets, sails, and so on. In sentence [(2)], however, the action that is being engaged in is one that is named by the speaker as mat-unrolling, where both the idea of unrolling and mats share in describing the action. (1981, 214)

Object incorporation in Pohnpeian is a canonical instance of morphosyntactic NI in these and other respects. However, as we will see, not all NI is canonical; a remarkable array of constructions have been claimed to involve incorporation in some sense. Sorting through these and identifying common threads is the purpose of this chapter.

Since Kroeber (1909; 1911) and Sapir (1911), discussions of the proper treatment of NI have been preoccupied with three questions. First, what are the boundaries of the phenomenon? Does a construction qualify as morphosyntactic NI if the "verb" is not an independent word of the language, but rather a verb-forming affix – in other words, if it *requires* incorporation? Constructions of this type fall under the rubric of incorporation for Sadock (1980), Rosen (1989), Van Geenhoven (1998), Chung and Ladusaw (2004), and Haugen (2004), but not for Kroeber (1911), Sapir (1911), Mithun (1984), Baker, Aranovich, and Golluscio (2005), or Gerdts and Marlett (2008). Similarly, what if the incorporated "noun" has the internal

structure of a phrase (NP) rather than a head (N), and so the "complex verb" might be thought to be a phrase (VP) rather than a head (V)? Such constructions are analyzed as instances of morphosyntactic NI in Ball (2005) and Baker (2009), but not Massam (2001). Second, is the complex verb of NI formed in the lexicon, by exclusively morphological operations, or created partly or wholly in the syntax? Controversy over this question began in the famous interchange between Kroeber (1909; 1911) and Sapir (1911); the best-known recent players in the debate are Mithun (1984; 1986), Di Sciullo and Williams (1987), Rosen (1989), and Anderson (1992; 2000; 2001), on the lexical side, and Sadock (1980; 1986; 1991) and Baker (1988; 1996; 2009) on the syntactic side. Massam (2009) observes that in frameworks such as Distributed Morphology (e.g., Halle and Marantz 1993; Embick 2010), which accomplish much of classical word formation in the syntax, the controversy dissolves. Third, what is the typology of NI, and how exactly is its morphosyntax connected to the meaning of NI and its use in discourse? Research in this last area builds especially on Mithun (1984), Rosen (1989), and Van Geenhoven (1998).

The focus of this chapter is on the third question: the interplay between the morphosyntax and semantics–pragmatics of NI. Accordingly, we can afford to sidestep some details and challenges posed by the first two questions. We take NI to include constructions in which the incorporating "verb" is an affix (also called *denominal verb constructions*; see Gerdts and Marlett 2008), as well as constructions in which the incorporee has the internal structure of an NP (also known as *pseudo noun incorporation*; see Massam 2001). A "big tent" approach makes sense, given that these constructions share the same semantic–pragmatic profile as other instances of NI. Our discussion of the morphosyntax of NI will survey the empirical landscape without committing to any one morphological or syntactic analysis. Much of our discussion can be read as compatible with either style of analysis.

Section 2 of this chapter investigates the morphosyntax of NI. We survey the space within which particular languages can exemplify the twin characteristics of NI, namely, that the incorporee be small and form an unusually close bond with the verb. We also discuss some morphosyntactic accounts of NI within generative syntax. Section 3 turns to the semantics of NI and theoretical accounts that have extended "semantic incorporation" beyond the bounds of morphosyntactic NI. Section 4 concludes.

2 What NI looks like: morphosyntax

Despite the lack of consensus over constructions at the margins, there is broad agreement that NI has a characteristic morphosyntactic profile that is paired with a distinctive semantics. Mithun (1984), who was the first to explore this territory in depth, proposed a typology of NI that remains highly influential. Although we return to Mithun's typology later, the overview of morphosyntactic NI given in this section shares more with Gerdts (1998), Massam (2009), and Johns (2017).

2.1 The basics

In NI, a verb combines with a noun (phrase) – henceforth the *incorporee* – to form a close unit that is morphosyntactically a complex verb. As mentioned earlier, we take NI to extend to verbs that are realized only as affixes. When the verb is affixal, incorporation is obligatory; otherwise, when the verb occurs independently as a word of the language, incorporation appears to be optional.[2]

Most of the morphosyntactic restrictions on NI concern the incorporee, which is distinguished by its small size and lack of syntactic–semantic independence.

In terms of size, the incorporee is at least a noun (N) but smaller than a determiner phrase (DP): it cannot include an article, demonstrative, or quantifier, nor can it be a pronoun. The fact that the incorporee is smaller than DP has semantic ramifications (see section 3). Languages differ in whether they allow the complex verb of NI to include not only the incorporee but also other sub-constituents of the incorporee's noun phrase (NP), such as complements to N, modifiers, or a possessor. Languages also differ in whether they allow the incorporee to strand sub-constituents of NP outside the complex verb; for instance, a demonstrative, modifiers, or a possessor.

The incorporee is typically the internal argument of a transitive verb. Some languages also allow the incorporating verb to be unaccusative, or the incorporee to be an adjunct – usually a locative or instrument. However, it is a robust crosslinguistic generalization that external arguments cannot be morphosyntactically incorporated (Baker 1988; 1996; Baker, Aranovich, and Golluscio 2005).

The incorporee does not function as a morphosyntactically independent constituent, so it is typically invisible for case-marking, agreement, and the calculation of transitivity.

Finally, some languages allow the incorporee to be doubled by an independent DP. In such cases, the incorporee is not semantically independent, in that it evidently does not saturate the relevant argument of the verb.

These aspects of morphosyntactic NI can be illustrated by a comparison of NI in four languages: Mapudungun (affiliation uncertain), Chukchi (Chukotko-Kamchatkan), Maori (Polynesian), and Hopi (Uto-Aztecan).

2.1.1 Mapudungun

Mapudungun, an isolate spoken in Chile and Argentina, has relatively free word order, no case-marking, and various null arguments (Baker, Aranovich, and Golluscio 2005). Verbs agree with their subject and direct object, although object agreement is sometimes unrealized (Baker, Aranovich, and Golluscio 2005; 141, 144–145). The transitive sentence in (3) shows that subject and object agreement are realized as verb suffixes.

(3) Mapudungun

Ngilla-fi-ñ	ti	waka.
buy-3O-IND.1S	the	cow

'I bought the cow.'

Mapudungun has NI: a transitive verb can combine with an N corresponding to its internal argument to form a complex verb. The complex verb is intransitive: it agrees with the subject, but it cannot agree with the incorporated object, as (4) shows. In other words, the incorporee is invisible for agreement purposes.

(4) Mapudungun
Ngilla-waka-(*fi)-n.
buy-cow-3O-IND.1S
'I bought a cow.'

NI in Mapudungun is limited to transitive verbs and to incorporees that are N. Unaccusatives generally cannot serve as incorporating verbs; compare (5a), without NI, and (5b), with NI.[3]

(5) Mapudungun
a. Furkü-y mate.
cool-IND.3SS mate
'The mate (a traditional regional drink) got cold.'

b. *Furkü-mate-y.
cool-mate-IND.3SS
('The mate got cold.)

The incorporee cannot strand a demonstrative or modifier outside the complex verb (see (6a)), nor can it be doubled by an independent DP (see (6b)).

(6) Mapudungun
a. *Pedro ngilla-waka-y {tüfachi / kechu / küme }.
Pedro buy-cow-IND.3SS this five good
('Pedro bought {this/five/good} cow(s).')
(Baker, Aranovich, and Golluscio 2005, 162)

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

2.1.2 Chukchi

Chukchi is a morphologically rich language with subject and object agreement and ergative–absolutive case-marking. The sentences in (7) illustrate this intricate morphology, which often cannot be segmented.

(7) Chukchi
a. ənan qaa-t qərir-ninet.
he.ERG deer-ABS.PL seek-3SG.S/3PL.O
'He looked for the reindeer.'
(Spencer 1995, 444)

b. ŋejə-k ʔəlʔəl təlgə-gʔi.
hill-LOC snow.ABS thaw-3SG.S
'The snow thawed on the hill.'
(Spencer 1995, 451)

Chukchi has a particularly exuberant version of NI. The incorporee can bear a wide range of semantic relations to the incorporating verb. It can be the internal argument of a transitive or unaccusative verb, as in (8).

(8) Chukchi
a. ətlon qaa=rer-gʔe.
he.ABS deer=seek-3SG.S
'He looked for the reindeer.'
(Spencer 1995, 444)

b. ŋejə-k ʔələ=lgə-gʔi.
hill-LOC snow=thaw-3SG.S
'The snow thawed on the hill.'
(Spencer 1995, 451)

It can also be an adjunct that names location, goal, source, or instrument. Compare (9a), without NI, and (9b), with NI.

(9) Chukchi
a. gətg-etə qət-gʔi walwəŋən.
lake-DAT go-3SG.S raven.ABS.SG
'Raven went to the lake.'
(Spencer 1995, 458)

b. gətg=əlqət-gʔe walwəŋən.
lake=go-3SG.S raven
'Raven went to the lake.'
(Spencer 1995, 458)

The incorporee can be a modifier that expresses aspect or manner. Such cases technically fall outside the bounds of NI, since what gets incorporated is not N but rather an adjective or adverb.

(10) Chukchi
a. n-ure-w təjəlqetgʔek.
ADV-long-ADV 1.slept
'I slept for a long time.'
(Spencer 1995, 456)

b. t-ure=jəlqet-gʔek.
1SG.S-long=sleep-1SG.S
'I slept for a long time.'
(Spencer 1995, 456)

Perhaps most surprisingly, an incorporating verb can combine with multiple incorporees. In (11b), the verb *uwicwen* 'play' has incorporated an instrument (*qepl* 'ball'), a modifier of duration (*ure* 'long time'), and a location (*nəki* 'at night').

(11) Chukchi

a. nəki-te n-ur-ʔew mən-uwicwen-mək qepl-e.
night-INSTR ADV-long.time-ADV 1PL.IMPER-play-1PL.S ball-INSTR
'Let's spend a lot of time playing ball at night.'
(Spencer 1995, 459)

b. mən-nəki=ure=qepl=uwicwen-mək.
1.PL.S.IMPER-night=long.time=ball=play-1.PL.S
'Let's spend a lot of time playing ball at night.'
(Spencer 1995, 459)

Chukchi requires the incorporee to be a head. In NI, for instance, the incorporee must be N. This N cannot strand a demonstrative or modifiers outside the complex verb, nor can it be doubled by an independent DP. However, Chukchi has another productive type of incorporation that allows N to combine with a defocused modifier to form a complex N (Spencer 1995, 450). Compare (12a) with (12b), in which this other incorporation has combined N with an adjective, and the entire complex N is surrounded by the circumfix that realizes the comitative 1 case.

(12) Chukchi

a. nə-təŋ-qin pojg-ən
ADJ-good-ADJ spear
'good spear'
(Spencer 1995, 478)

b. ga-taŋ=pojgə-ma
COM-good=spear-COM
'with a good spear'
(Spencer 1995, 478)

This other incorporation allows N to combine with multiple modifiers, as (13) shows.

(13) Chukchi
ga-tor=taŋ=kətepa=nalgə-ma
COM-new=good=ram=skin-COM
'with a new, good, ram's skin'
(Spencer 1995, 480)

A complex N formed by incorporation can serve as the incorporee in NI. This is illustrated in (14), in which NI has affected the internal argument of a transitive verb.[4]

(14) Chukchi
tə-tor=taŋ=pəlwəntə=pojgə=pela-rkən.
1SG.S-new=good=metal=spear=leave-PRES
'I am leaving a new, good, metal spear.'
(Spencer 1995, 480)

Finally, the incorporee in Chukchi NI is invisible for case-marking, agreement, and the calculation of transitivity. This is most obvious when the incorporee is the internal argument of a transitive verb. Then the result of NI is an intransitive sentence: the subject is inflected for absolutive case, not ergative case (see (8a)), the complex verb does not show object agreement, and the complex verb can undergo applicative formation, which is otherwise available only for intransitives (Spencer 1995, 463).[5]

2.1.3 Maori

Maori is a verb-initial language with flexible order of arguments and adjuncts after the verb. The language has nominative–accusative case-marking, no agreement, and various null arguments. In narrative discourse, passive sentences (such as (15b)) are more frequent than transitive sentences (such as (15a)).

(15) Maori

a. Ka inu te tangata i te wai.
TAM drink the man DO the water
'The man drinks the water.'
(Biggs 1969, 32)

b. Ka inu-mia te wai e te tangata.
TAM drink-PASS the water by the man
'The water is drunk by the man.'
(Biggs 1969, 32)

Maori has NI: a transitive verb can combine with a noun (phrase) corresponding to its internal argument to form a complex verb.

(16) Maori

E inu wai ana ia.
TAM drink water TAM she
'She is drinking water.'
(Bauer 1997, 132)

Several sorts of evidence reveal that the complex verb is indeed V. It can take the nominalizing suffix -C*anga*, which attaches only to verbs and to certain manner adverbs modifying them (Bauer 1997, 516–517).

(17) Maori

tā rātou ruku kōura-tanga
the.of them dive crayfish-NOM
'their crayfish diving'
(Bauer 1997, 527)

And it is immediately followed by particles, such as the tense-aspect-mood particle *ana* in (16), which occur only to the immediate right of V (Bauer 1997, 89–90, 95–97; but compare the discussion of Niuean in section 2.4).

As in Mapudungun and Chukchi, the incorporee in Maori cannot strand an article, demonstrative, or modifier outside the complex verb, nor can it be doubled by an independent DP. Where Maori differs is in the size of the incorporee. The incorporee can consist of a compound noun, bracketed in (18).

(18) Maori

I	muri	mai	i	nga	whakaongaonga,	kai te
at	after	to.here	DO	the.PL	excitement	TAM

hiahia	[kapu	tī]	ahau.
want	cup	tea	I

'After all the excitement, I need a cup of tea.'

(Chung and Ladusaw 2004, 138)

It can also consist of a noun followed by an adjective modifier (as in (19a)), a PP modifier (as in (19b)), or a relative clause (as in (19c)).

(19) Maori

a.

E	rukuruku	[kōura	nunui]	ana	ia.
TAM	dive	crayfish	big	TAM	she

'She is diving for crayfish.'

(Chung and Ladusaw 2004, 139)

b.

Hai	nga	hōtoke	ka	purei	[pirori	ki	rō
in	the.PL	winter	TAM	play	bowl	at	inside
whare]	ahau.						
house	I						

'In winter, I play indoor bowls.'

(Chung and Ladusaw 2004, 140)

c.

Nā reira	i	tahuri	ai	te	wahine	rā	ki te	kimi
therefore	TAM	turn	PRO	the	woman	that	INFIN	find
[huarahi	e	ea		ai	ōna	wawata].		
way	TAM	be.satisfied		PRO	her.PL	desire		

'Therefore the woman set about finding a way by which she could realize her goal.'

(Chung and Ladusaw 2004, 139)

The incorporee, in other words, can have all the internal structure of NP.

Despite the fact that the incorporee can be NP, it is invisible for the calculation of transitivity: the complex verb is intransitive.

2.1.4 Hopi

Hopi is a verb-final language with nominative–accusative case-marking and a range of null arguments. Verbs agree in number with the subject, or with the absolutive if agreement is via suppletion (Bliss 2005).

Hopi has NI: a transitive verb can combine with a noun corresponding to its internal argument to form a complex verb. Compare the transitive sentence in (20) with the sentence with NI in (21).

(20) Hopi
Pas nu' pu' wuko-taqa-t kaneelo-t niina.
PRT I then big-man-ACC sheep-ACC kill
'I killed a big male sheep this time.'
(Gronemeyer 1996, 26)

(21) Hopi
Itam taavok kanel-nina-ya.
we yesterday sheep-kill-PL:S
'We killed a sheep yesterday.'
(Gronemeyer 1996, 26)

The incorporating verb in (21) occurs as an independent word of the language, as (20) shows. (Nouns and verbs undergo vowel shortening or deletion in certain affixed forms; see Jeanne 1982.) However, Hopi also has several suffixes which can be given verb meanings ('make', 'become', 'have') and which combine with a noun corresponding to their internal argument to form verbs (Haugen 2008, 457). Building on Hill (2003), Haugen (2004, 175ff.) analyzes these suffixes as incorporating verbs that require NI. On this analysis, the incorporating verb in (22) is the suffix *-ta* 'make, CAUSATIVE'.[6]

(22) Hopi
Nu' lööq-mu-y ho'ap-ta.
I two-PL-ACC burden.basket-make
'I made two burden baskets.'
(Gronemeyer 1996, 34)

NI in Hopi has the same morphosyntactic profile whether it is optional or obligatory – a point emphasized by Haugen (2004). For instance, the incorporee must be N, but can be modified by an adjective, demonstrative, numeral, or quantifier that is stranded outside the complex verb (see (22)). These stranded modifiers appear in the accusative case – unlike the incorporee, which is caseless – and can be separated from the incorporee by other constituents. In (23a) (optional NI) and (23b) (obligatory NI), the incorporee is modified by the demonstrative *i-t* 'this'.

(23) Hopi
a. Nu' pay i-t töövu-t aw qötö-tpe.
I well this-ACC embers-ACC to.it head-roast
'I roasted this head over the embers.'
(Haugen 2004, 178)

b. Hak i-t kis-ta?
who? this-ACC shade-make
'Who built this shade?'

(Haugen 2004, 181)

In addition, the incorporee can be doubled by a DP in the accusative case. This is shown for optional NI in (24a) and obligatory NI in (24b).

(24) Hopi

a. Nu' yòypala-t kùy-tàngta.
I rainwater-ACC contained.liquid-put.into.containers
'I put the rainwater into containers.'

(Haugen 2004, 178)

b. Qötsa-tavo-t pòoko-'y-ta.
white-cottontail-ACC pet-have-DUR
'He has a white rabbit for a pet.'

(Gronemeyer 1996, 34)

Finally, when the incorporating verb shows number agreement via suppletion, it can evidently agree in number with the internal argument (Gronemeyer 1996, 33). Compare (21) with (25).

(25) Hopi

Nu' pu' totokmi naalöq kanèl-qöya.
I this dance.day four sheep-kill(SG:S.PL:O)
'This year I butchered four sheep for the dance day.'

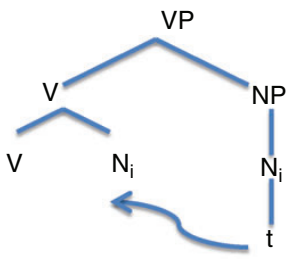
(Gronemeyer 1996, 33)

In such cases, it is unclear whether the verb is agreeing with the incorporee or a constituent outside the complex verb that is linked to the internal argument, such as a doubled DP that potentially contains stranded material or is a null argument. See section 2.3.

2.2 Incorporation as head movement

The dominant approach to the syntax of NI is Baker's (1988; 1996) head movement analysis. In this analysis, the complex verb of NI is created in the syntax when N undergoes head movement to adjoin to V, as shown below.

(26)



Independent principles of grammar ensure that N raises to V only when it originates as the head of V's NP sister, which bears a uniform semantic role.[7] In this way, the analysis gives an elegant account of much of the morphosyntax of NI surveyed in section 2.1. The incorporee, for instance, is typically the internal argument of V, and never the external argument (e.g., Mapudungun, Chukchi, Maori, and Hopi); the incorporee is typically N (e.g., Mapudungun, Chukchi, and Hopi); and in some languages, the incorporee can strand sub-constituents of NP outside the complex verb (e.g., Hopi). The head movement analysis claims further that when the incorporee is doubled, the independent DP is *not* V's sister (because that position is filled by the NP from which the incorporee originates). This claim has been investigated in just a few languages, including Mohawk (see Baker 1996, 41–88, 311, but Mithun and Corbett 1999 for a completely different view), and Chamorro (see Chung and Ladusaw 2004, 88–94).

It is trickier for the head movement analysis to handle other aspects of the morphosyntax of NI, such as the fact that the incorporee in some languages can be a locative, instrument, or other adjunct (e.g., Chukchi; see Baker 1996, 295), and the fact that the incorporee is sometimes but not always invisible for case-marking and agreement (e.g., Chukchi vs Hopi; see also Baker, Aranovich, and Golluscio 2005 on Mapudungun, Southern Tiwa, and Mohawk). Particularly challenging is the fact that the incorporee in some languages appears to be NP rather than N (e.g., Maori; see also Baker 2014 on Sakha and Tamil), since raising an NP to adjoin to V would violate the assumption that only heads adjoin to heads (Chomsky 1986).

For a survey of current syntactic analyses of NI, see Johns (2017).

2.3 Incorporation as a lexical operation

Lexical analyses of NI maintain that the complex verb is formed by morphological operations in the lexicon, usually by a species of compounding (see section 1 and Spencer 1995). Although the distance separating these analyses from head movement may be compressed in current, syntacticized morphological frameworks (see Barrie 2015), we can still ask what the empirical differences might be between the two approaches.

One difference emerges clearly from Rosen's (1989) lexical analysis, which recognizes two types of NI, called compound NI and classifier NI. In compound NI, the incorporee saturates the internal argument of the incorporating verb; in classifier NI, the incorporee serves as a "classifier" that does not saturate any argument, so that "[i]f the simple verb takes a direct object argument, then the complex verb also co-occurs with a direct object NP, which is required to satisfy the verb's argument structure" (Rosen 1989, 296). For Rosen, the complex verbs of compound NI and classifier NI are created in the lexicon, so there is no straightforward way for stranded material to form a syntactic constituent with the incorporee. This leads Rosen to claim that stranding is a form of doubling – that is, to analyze stranded material as an independent DP that doubles the incorporee but whose head N happens to be null.

Rosen's analysis predicts that whenever NI allows stranding, it should also allow doubling. The prediction holds true in many languages (e.g., Hopi; see also Mithun 1984, 869–870, on Mohawk). However, there are also languages – most famously, Greenlandic and Southern Tiwa – in which NI allows stranding but not doubling (Rosen 1989, 304–309; see also Baker, Aranovich, and Golluscio 2005, 149–150). Greenlandic, for instance, has a large number of suffixal verbs that require NI. As Sadock (1980, 307–309) observes, the incorporee can strand an adjective, numeral, or possessor outside the complex verb, but a doubled DP is not allowed (Sadock 1986, 27–28); compare (27a) and (27b).

(27) Greenlandic

a. Ataatsinik qamuteqarpoq.
ataaseq-nik qamut-qar-poq
one-INST.PL sled.PL-have-INDIC.3.SG
'He has one sled.'

b. *276-inik ammassannik ammassattorpoq.
276-inik ammassak-nik ammassak-tor-poq.
276-INST.PL sardine-INST.PL sardine-eat-INDIC.3SG
('He ate 276 sardines.')

(The incorporee in (27a), *qamutit* 'sled, carriage', is lexically specified as plural whether it is semantically singular or plural. The stranded adjective must also be plural; see Sadock 1980, 308.)

The head movement analysis, in contrast, predicts that stranding is independent of doubling, since stranding is claimed to be a side effect of head movement, whereas a doubled DP is an adjunct (see section 2.2). This correctly allows for the Greenlandic and Southern Tiwa patterns. But the analysis also suggests that when NI in a given language allows both stranding and doubling, the same incorporee should be able to strand material *and* be doubled by an independent DP. This prediction appears to be correct for Chamorro (Sandra Chung, p.c.); its status in other languages remains to be determined.

2.4 The complex verb as word vs phrase

Whether viewed as a creature of the lexicon or a product of movement, the complex verb of NI is canonically a morphosyntactic word. This is often revealed by its inflectional profile. The complex verb routinely shows verbal inflection, even when this inflection is separated from the incorporating verb by the incorporee; see the Chukchi verb agreement prefixes in (11b) and (14), the Mapudungun verb agreement suffix in (4), and the Maori nominalizing suffix in (17).

Over and above this, in many languages the complex verb of NI clearly forms a phonological word. In Chukchi, dominant–recessive vowel harmony, which applies within the phonological word, treats the complex verb as a phonological word (Spencer 1995, 445). In Greenlandic, sandhi processes that are obligatory

within the phonological word must apply between the incorporee and the incorporating verb (Sadock 1980, 303). In Pohnpeian, the vowel lengthening that affects monosyllabic nouns does not see a monosyllabic incorporee in certain complex verbs (Rehg 1981, 214); compare (1) and (2). Many similar examples could be cited.

The phonological status of the complex verb is less clear in other languages, either because word-internal phonology provides no relevant indications or because the question has not been investigated. When a language of this sort also has an impoverished inflectional system, positive evidence may be lacking that the complex verb of NI is a word in any sense.

These observations set the stage for Massam's (2001) analysis of *pseudo noun incorporation* (henceforth pseudo-NI) in Niuean. Massam coined this term for apparent instances of NI in which the incorporee has the internal structure of an NP. She claimed that in such cases, the verb and the NP do not form a complex verb, but are merely an ordinary VP.

Niuean is a Polynesian language with rigid VSO word order, no agreement, and ergative–absolutive case-marking. Case, number, and/or specificity are signaled by functional particles at the left edge of DP, as can be seen from the transitive sentence in (28).

(28) Niuean

Takafaga	tūmau	nī	e	ia	e	tau	ika.
hunt	always	EMPH	ERG	he	ABS	PL	fish

'He is always fishing.'

(Massam 2001, 157)

Transitive verbs and existential verbs can occur in a construction that appears initially to be NI. In this construction, the object, stripped of functional particles, appears to the immediate right of the verb. If there is an external argument, it appears in the absolutive case, suggesting that the object is invisible for the calculation of transitivity. Compare (28) with the apparent NI in (29).

(29) Niuean

Takafaga	ika	tūmau	nī	a	ia.
hunt	fish	always	EMPH	ABS	he

'He is always fishing.'

(Massam 2001, 157)

As in Maori (also Polynesian), the object in apparent NI has the internal structure of NP; the N may be accompanied by adjective modifiers, PP modifiers, and/or relative clauses.

(30) Niuean

Ne	kai	[sipi	mo	e	ika	mitaki]	a	Sione.
PST	eat	chip	COMTV	ABS	fish	good	ABS	Sione

'Sione ate good fish and chips.'

(Massam 2001, 160)

Massam (2001, 154, 161) contends that if the complex verb of NI must be a lexical head, and if heads cannot contain phrases, then this Niuean construction cannot be an instance of morphosyntactic NI. Instead, the NP is not incorporated into V after all; the two merely form an ordinary VP in which no special movement occurs to create the apparent incorporee's proximity to V. The closeness of the two is due to other factors.

On this analysis, Niuean verbs can select NP or DP complements. A DP complement must raise out of VP, to a position below the external argument, to be licensed for absolutive Case. Once that happens, the remnant VP raises to T's specifier, producing the VSO word order seen in transitive sentences like (28). In contrast, an NP complement does not need Case-licensing, and therefore does not raise out of VP. Once the (intact) VP raises to T's specifier, the result is the VOS word order seen in (29)–(30).

Pseudo-NI analyses have been widely adopted for constructions in which NI cannot be derived by head movement – notably, when the incorporee is an NP – and for other incorporation constructions that do not have the full profile of morphosyntactic NI – for instance, when the incorporee is case-marked (see Farkas and De Swart 2003 on Hungarian) or need not be adjacent to V (see Booij 2008 on Dutch and Dayal 2011 on Hindi). These analyses are attractive because they represent the null hypothesis: V and its object combine in the normally expected way. At the same time, such analyses are called into question when there is morphosyntactic or prosodic evidence that the verb and its object form a unit smaller than VP. Recent research suggests that this could well be the case for Niuean (see Clemens 2014) and other languages in which the incorporee is an NP (e.g., Fijian; see Aranovich 2013).

3 The interpretation of NI

We turn our attention now to the semantic interpretation of NI and the phenomenon of semantic incorporation (SI). Specifically, we ask how the semantic composition of the verb with the incorporee reflects the fact that they form a closer unit than would be expected in the usual combination of a verb with an argument. Given the crosslinguistic variation in the morphosyntax of NI, we do not assume that its semantics will be crosslinguistically uniform either.

Several semantic themes run through the literature on NI. How does NI affect the potential for further modification or specification of the incorporee? To what extent does the interpretation of NI reflect general properties of semantic composition rather than lexical word-formation processes? Why are incorporated arguments more limited than independent DPs in their scope potential? Under what circumstances do they show underspecification of semantic contrasts in definiteness or number? How do incorporated arguments function in the dynamics of discourse coherence?

Our focus will be on strategies for semantic composition in NI, but we also briefly consider issues of productivity and paradigmatic contrast.

3.1 Semantic themes and variations

Here we highlight these semantic themes by reviewing Mithun's (1984) and Rosen's (1989) typologies of NI.

Mithun (1984) proposes a four-part typology that connects the morphosyntax of NI to the incorporee's contributions to argument structure and discourse. She takes the paradigm case of NI to be the compounding of a verb with a noun to create a derived verb. By identifying the incorporee with a semantic argument of the verb, the meaning of the derived verb comes to be limited in some way by the meaning of the noun. The incorporee

> no longer refers to a specific entity; instead it simply narrows the scope of the V. It is thus unaccompanied by markers of definiteness or number. … Although it may function semantically as a patient, location, or instrument, it has no independent syntactic role … and so is unmarked for case. (1984, 856)

As noted earlier, NI canonically contrasts with a structure in which the noun is the head of an independent DP that serves as the verb's internal argument. Mithun illustrates this with examples from Mokilese, a Micronesian language closely related to Pohnpeian (see Harrison 1976). Compare (31a), which has a transitive verb with an independent direct object, and (31b), which shows NI:

(31) Mokilese

a. Ngoah kohkoa oaring-kai.
I grind coconut-these
'I am grinding these coconuts.'
(Harrison 1976, 159)

b. Ngoah ko oaring.
I grind coconut
'I am coconut-grinding.'
(Harrison 1976, 159)

According to Mithun (1984, 850),

> the sentences with independent objects would be used if the objects were noteworthy in their own right; but those with incorporated objects indicate unitary, institutionalized activities of coconut-grinding. … The objects do not refer to specific coconuts … but simply modify the type of activity under discussion. As Harrison notes ([1976], 162), "the addition of the noun refines the meaning of the verb in question, limiting its application to the set of objects named by the noun."

In our terms, the incorporee's essential semantic contribution in (31b) is to restrict an *argument parameter* of the verb; here, the affected theme role linked to the direct object in (31a). We use the term "argument parameter" rather than "semantic argument" to call attention to the fact that it can be restricted without being saturated, and we dub the incorporee's semantic contribution *predicate restriction*. Further, while the use of (31b) supports an inference that there must in fact be some coconut

flesh being ground, that is irrelevant and not made salient for the purposes of discourse reference.

Mithun identifies NI of the Mokilese and Pohnpeian type as Type I incorporation. (In addition, Type I incorporation involves detransitivization; see section 2.1.) She identifies three further types of NI that have different morphosyntactic, semantic, and discourse profiles. The four types are arranged in an implicational hierarchy that is intended to account for the crosslinguistic variation in NI.[8]

In Type II incorporation, the complex verb may have a direct object DP that is linked to an argument parameter that would otherwise be realized as an oblique phrase. This type of NI is illustrated for Yucatec (Mayan) in (32b), where the complex verb 'water-spill' takes a direct object that realizes a location argument (see Mithun 1984, 858).

(32) Yucatec

a. K-in-wek-Ø-k ha'.
INCOMP-I-spill-it-IMPF water
'I spill water.'

b. K-in-wek-ha'a-t-ik.
INCOMP-I-spill-water-TR-IMPF
'I splash him (Lit.: I water-spill on him).'

In both Type I and Type II, the incorporee restricts an argument parameter of the incorporating verb. The two types differ in the effect of incorporation on the complex verb's argument structure. In Type I, predicate restriction eliminates the possibility of a direct object, whereas in Type II, incorporation allows a different argument parameter to be linked to the direct object. In both types, the incorporee is treated as nonspecific and indefinite, not linked to prior discourse or salient for subsequent pronominal reference.

Mithun observes that in some polysynthetic languages, incorporees do not uniformly function as nonspecific indefinites. In Type III incorporation, illustrated later for Chukchi and Mapudungan, the incorporee can also be linked to a previously introduced discourse entity. The contrast between Type III and Types I–II suggests that predicate restriction by an incorporee does not have a uniform effect on discourse coherence.[9]

Mithun identifies Type IV incorporation as "classificatory." In this type, an incorporee may restrict an argument parameter of the verb but still co-occur with an independent DP that expresses more specific reference. These cases correspond to what was called doubling in section 2.

Others have noted that Mithun's typology is difficult to apply to current understandings of morphosyntactic NI. In addition, it probably does not capture the full semantic–syntactic diversity of NI. (Among other things, Mithun's implicational hierarchy predicts that whenever doubling is allowed, it should be possible to link the incorporee to a previously introduced discourse entity. See sections 2.1.4 and 3.2.2 for a counterexample from Hopi.) Nonetheless, the typology represents the first explicit attempt to grapple with

what a formal theory of the semantic interpretation of NI must provide: an account of how NI restricts an argument parameter of the verb and how it affects the linkage between the verb's semantic arguments and its syntactic dependents.

Rosen's (1989) typology of NI is not as elaborate (see section 2.3). She too analyzes NI as a lexical operation that combines a noun with a verb to form a complex verb. In her account, a lexical verb is associated with an argument structure that links its syntactic dependents to argument parameters. Rosen identifies something like predicate restriction as the consistent semantic consequence of NI, and proposes a two-way typology based on whether incorporation also alters the verb's argument structure.

Compound NI detransitivizes the verb, thereby eliminating the possibility of associating the argument parameter restricted by the incorporee with an independent DP. Compound NI is therefore expected not to allow stranding of modifiers associated with the incorporee, or further specification through doubling by an independent DP.

By contrast, classifier NI leaves the argument structure of the verb unchanged, and "the incorporated noun places a selectional restriction on the verb, such that the object [D]P must be within the class of objects delineated by the incorporated noun root" (Rosen 1989, 297). By leaving the verb's argument structure intact, classifier NI allows for the incorporee to be doubled by an independent DP. Languages that have classifier NI as well as null (pro)nouns may appear to strand modifiers without repeating the incorporee, but in Rosen's account this stranding is treated as a subcase of doubling.

While Rosen's typology does not fully address the issues of semantic interpretation raised by NI, it usefully raises the question of whether the semantics of predicate restriction is independent of the ability of an incorporating verb to integrate the restricted parameter with further clausal constituents, whether they are modifiers of the incorporee or independent DPs.[10]

We now turn to attempts to give more formal semantic accounts of predicate restriction by incorporation.

3.2 Semantic incorporation

Relative to independent DPs, incorporees have a narrower range of interpretations in terms of semantic content, scope of composition, and discourse function that is related to their morphosyntactic smallness. A noun or NP, but never a full DP, an incorporee can express a property, but not the full range of meanings available to DPs, which may be entity-denoting or express generalized quantifiers.

In many – perhaps most – languages, the incorporee has the semantic import of a nonspecific indefinite that is indeterminate with respect to number and has limited discourse salience. If morphosyntactic closeness entails that the verb meaning be composed with the incorporated argument to form an appropriate meaning for a complex verb, then the incorporee will be composed before the meanings of other clausal elements are integrated. The result is that incorporees are scopally

inert, always falling within the scope of other clausal elements such as negation and quantifiers.

This cluster of properties has come to be referred to as *semantic incorporation* (SI), following Van Geenhoven (1998), with various accounts seeking to derive the semantic profile of NI from limitations on the semantic content of incorporees or the way in which the meaning for the complex verb is composed. McNally (2004) gives an account of the behavior of Spanish bare plurals that focuses on the limitation of their semantic contents to expressing properties of individuals. Carlson (2003) discusses predicate restriction through incorporation as restrictive modification of verb meanings that are modeled as event types. Below we review approaches to embedding SI into formalized semantic theories, comparing their approaches to predicate restriction, the effect of incorporation on the verb's argument structure, and their predictions about the discourse status of the incorporated argument.

While interest in SI is rooted in the analysis of languages that exhibit morphosyntactic NI, the term has been extended to languages in which *independent DPs* show the cluster of semantic–pragmatic properties characteristic of incorporees. If we treat these independent DPs and the verbs they combine with as exhibiting SI but not NI, then SI does not have a uniform morphosyntax. In other words, morphosyntactic NI entails SI, but SI is also found in constructions distinct from morphosyntactic NI (see Borik and Gehrke 2015 for further discussion).

3.2.1 SI as lexical composition

In her groundbreaking study of the semantics of morphosyntactic NI in West Greenlandic, Van Geenhoven (1998) observes a constellation of properties associated with the incorporee that she takes to be characteristic of SI more generally. These properties are:

- interpretation as a nonspecific indefinite, unlinked to previous discourse;
- inability to take scope over other operators;
- number neutrality, in the absence of additional modification or inflection; and
- the potential to support limited subsequent anaphoric reference.

To account for these properties, Van Geenhoven proposes a formal semantic analysis in which the incorporee in NI is a predicative indefinite description that is "absorbed" by an incorporating verb as a predicate on the verb's internal argument.

Van Geenhoven's proposal is situated within the Kamp–Heim tradition of analyzing varieties of indefinites as non-quantificational descriptions whose quantificational force and scope are determined in context (Kamp 1981; Heim 1982). She proposes that the incorporee contributes only a predicate to semantic interpretation, whereas indefinites that are independent DP arguments are associated with restricted free variables. In her analysis, the predicate contributed by the incorporee is integrated with the lexical meaning of the incorporating verb to restrict the verb's internal argument parameter. The restricted internal argument parameter is bound

by an existential operator (i.e., existentially closed) within the lexical meaning of the incorporating verb.

The analysis can be illustrated with the West Greenlandic example of NI in (33). Here the complex verb is formed by combining the affixal verb *-tur* 'eat' with the uninflected noun *iipili* 'apple'. The sentence conveys that Arnajaraq participated in an apple-eating event, with no implication concerning the number of apples eaten.

(33) West Greenlandic
Arnajaraq iipili-tur-p-u-q.
Arnajaraq.ABS apple-ate-IND-[-TR]-3SG
'Arnajaraq ate an apple/apples.'
(Van Geenhoven 1998, 141)

This sentence contrasts with a transitive sentence in which the direct object is interpreted as definite or specific, as well as with the corresponding detransitivized (anti-passive) sentence.

Van Geenhoven (1998, 32) represents the lexical meaning of the incorporating verb as in (34). This verb meaning combines with the property expressed by the incorporee to yield a one-place predicate which is the meaning of the complex verb in (33); see (35) (Van Geenhoven 1998, 143).

(34) *The lexical meaning of an incorporating verb*
$\lambda P_{<s,<e,t>>}\ \lambda w_s\ \lambda x_e\ \exists y\ [Verb_w(x,y) \wedge P_w(y)]$

(35) *The meaning of the complex verb in (33)* =
$\langle \lambda w \lambda x \exists y\ [eat_w(x,y) \wedge apple_w(y)], \varnothing \rangle$

The existential quantifier in the meaning of the incorporating verb indicates that the incorporee is to be interpreted as a nonspecific indefinite with the potential for existential entailment. The lexical scope of the quantifier dictates that the incorporee must be interpreted within the scope of negation or a quantificational operator in the clause, thus ensuring that the incorporee is scopally inert.

In West Greenlandic, the incorporee may be modified by constituents that occur outside the complex verb, such as adjectives, numerals, and relative clauses; these appear in the instrumental case. This modification does not alter the core properties of SI; the incorporee remains interpreted as a nonspecific indefinite with narrowest scope. Because the additional constituents may convey information about number, the incorporee's inherent number neutrality may be resolved by the content or inflection of the modifiers, as in (36):

(36) West Greenlandic
Marlun-nik ammassat-tur-p-u-nga.
two-INST.PL sardine-eat-IND-[-TR]-1SG
'I ate two sardines.'
(Van Geenhoven 1998, 151)

This ability to further restrict the internal argument parameter with independent modifiers corresponds to what we earlier termed "stranding." The possibility of

stranding follows directly from an account of morphosyntactic NI in terms of head movement (see section 2.2). Van Geenhoven's lexical account of NI in West Greenlandic includes a mechanism by which these additional modifiers may be absorbed by the verb meaning without changing scope relations (1998, 146–149).[11]

The semantic restrictions uncovered by Van Geenhoven for the incorporee in West Greenlandic hold far more generally for morphosyntactic NI. In language after language, the incorporee has the meaning of a common noun, cannot be quantified, and is typically given an indefinite interpretation. In the few languages besides West Greenlandic in which the scope properties of the incorporee have been explored – for example, Chamorro (Chung and Ladusaw 2004), Danish (Asudeh and Mikkelsen 2000), Hindi (Dayal 2011), and Hungarian (Farkas and De Swart 2003) – the incorporee must have narrowest scope. Information about the scope profile of NI in other languages is harder to come by, but the available evidence is consistent with this picture. Consider Mapudungun and Maori, two of the languages used to illustrate NI in section 2.1. The single Mapudungun example of a negative sentence cited by Baker, Aranovich, and Golluscio (2005, 145) has the incorporee taking narrow scope with respect to negation.[12]

(37) Mapudungun
Mapuche nie-kawell-la-y-ngün.
Mapuche have-horse-NEG-IND-3PS
'The Mapuche do not own horses.'

In Maori, it is clear from narrative texts and from our fieldwork that the incorporee must take narrow scope with respect to negation. The meaning of (38), for instance, is that there are no children digging for any worms, not that there are worms that no children are digging for.

(38) Maori
Kāore he tamariki e kari noke ana.
TAM.not a children TAM dig worm TAM
'No kids are digging for worms.'

(Timoti S. Karetu, p.c.)

Further investigation of the interpretation of NI in particular languages is needed to fill in this part of the empirical landscape. Meanwhile, we assume that the scope possibilities of the incorporee in NI are crosslinguistically stable: the incorporee must have narrowest scope.

3.2.2 Profiles of NI in discourse dynamics

Morphosyntactic NI backgrounds information in discourse: it is used when a potential referent for the incorporee is incidental, less salient, or insignificant. This insight is due to Mithun (1984), who observes that NI tends to be used when the incorporee is general as opposed to particular, inanimate as opposed to animate, or when it denotes a minor or unremarkable entity "that will play no further role in the discourse" (1984, 866).

While the backgrounding function of NI appears fairly uniform across languages, there is crosslinguistic variation in the incorporee's formal contribution to discourse dynamics. Sadock (1980, 311; 1986) demonstrated that in Greenlandic the incorporee can support later anaphoric reference by a pronoun, what Van Geenhoven terms "discourse transparency" (1998, 107, 187). Van Geenhoven (1998, 37) observes that the incorporee in West Greenlandic cannot be interpreted as referring to a particular entity already familiar in the discourse. In effect, the incorporee patterns like an indefinite description: it must be interpreted as novel with respect to the discourse. Further, novel reference cannot be partitive, that is, it is established with respect to a discourse-familiar set of entities.

On the other hand, Mithun (1984) showed that in Caddo, Huahtla Nahuatl, and Koryak, among other languages, the incorporee can be anaphoric to a familiar discourse referent; in this respect, it patterns like a definite description.

Further probing reveals an even greater range of diversity. Some languages with NI allow the incorporee to accommodate subsequent pronominal reference, whereas others do not; some languages allow the incorporee to refer back to a previously established discourse referent, whereas others do not; and all possible settings of these parameters are attested. We show this for the languages used to illustrate NI in section 2.1.

In Mapudungun, the incorporee can support subsequent pronominal reference. In (39), the incorporee bracketed in the first sentence is referred to by the null object pronoun cross-referenced by object agreement in the second sentence.

(39) Mapudungun

Ngilla-[waka]-n.	Fey	langüm-fi-ñ.
buy-cow-IND.1SS	then	kill-3O-IND.1S

'I bought a cow. Then I killed it.'

(Baker, Aranovich, and Golluscio 2005, 146)

The incorporee can also refer back to a previously established discourse referent, as in (40), where the incorporee in the second clause refers back to the independent DP *pali* 'the ball' in the first clause.[13]

(40) Mapudungun

Kiñe	kelluwen	rëtre-ke-0-y	pali	ñi	tripalwe	pële
one	team	push-HAB-3O-IND.3SS	ball	3.POSS	goal	toward
kangelu	ingkawen	katrütu-[pali]-ke-y.				
other	side	intercept-ball-HAB-3SS				

'One team pushes the ball toward their goal, and the other side tries to intercept it.'

(Baker, Aranovich, and Golluscio 2005, 145)

In Chukchi, the incorporee can refer back to a previously introduced referent as long as it is backgrounded – that is, not likely to be mentioned again (Spencer 1995, 449).

(41) Chukchi

gəm-nan	pətlak	tə-re-neren-ŋ-ən	ʔecuulg-ən
I-ERG	on.purpose	1SG.S-FUT-drop-FUT-3SG.O	night.pot
ənkʔam	gət	[ʔacoo]=rʔetgəpə-jgot	tə-re-ntə-gət
and	you.ABS	night.pot =go-CAUSE	1SG.S-FUT-AUX-2SG.O.

'I'll drop the night pot deliberately and I'll make you fetch it.'

(Spencer 1995, 449)

But incorporees evidently cannot support subsequent pronominal reference. Instead, an independent DP is used to set up a discourse referent that can then be referred to later by an incorporee (Mithun 1984, 860–862).[14]

In Maori, incorporees are discourse-inert: they can neither introduce a novel referent nor refer back to one that has been previously introduced. Their inability to set up a discourse referent is well illustrated by (42), from a written history of the Te Arawa tribe.

(42) Maori

Ka	ea	kia	hanga	[pā]	ma	rāua,	ā,	na	
TAM	decide	TAM	build	fort	for	them.DU	and	TAM.of	
rātou	ko	ta	rāua	iwi	i	mahi	he	pā,	
them.PL	PRED	the.of	they.DU	tribe	TAM	make	a	fort	
ka	oti.								
TAM	done								

'[The two brothers] decided to construct a fort for themselves. They and their tribe did this (lit. built a fort) and it was completed.'

(Jones and Biggs 1995, 125 [15.33])

Here the noun *pā* 'fort' appears as the incorporee in the first clause and in the second clause as an indefinite DP *he pā* 'a fort'. But there is just one fort under discussion – the fort that the brothers decided to build and then built. Had the incorporee been sufficient to introduce (or accommodate) a discourse referent, that referent would have been picked up in the second clause by a definite DP (*te pā* 'the fort').

Moreover, incorporees in Maori cannot refer back to a previously established discourse referent. This is revealed by the fact that the extensive textual material contains no sections of discourse like (40) or (41).

In Hopi, finally, the incorporee can introduce a discourse referent, as (43) shows (Gronemeyer 1996, 31–32; Haugen 2004, 183).

(43) Hopi

Nu'	[pakiw]-maqto-ni;	noqw	itam	pu-t	enang
I	fish-go.hunting-FUT	so.that	we	that-ACC	in.addition.to
nöö-nösa-ni.					
PL:S-eat-FUT					

'I'm going fishing, so we can eat it (fish) along with the other food.'

(Haugen 2004, 183)

But, as in Greenlandic, the incorporee apparently cannot refer back to a previously established discourse referent.

In sum, all four cells of the typological space are filled:

(44) *The discourse contribution of the incorporee*

	Sets up DR	*Refers back to DR*
Mapudungun	+	+
Chukchi	−	+
Maori	−	−
Greenlandic, Hopi	+	−

In addition, the discourse contribution of the incorporee can be dictated by the lexical meaning of the incorporating verb. Massam (2001) shows that in Niuean, NPs that are (pseudo) incorporated by transitive verbs are discourse-inert, but an NP incorporated by the existential verb *fai* 'exist' sets up a discourse referent.

Van Geenhoven's analysis of West Greenlandic handles the discourse contribution of the incorporee through the existential quantifier included in the lexical meaning of the incorporating verb and its potential for existential entailment. Her account, which predicts that the incorporee should introduce a discourse referent and support later anaphoric reference by pronouns, does not generalize well to the other options in (44).

Certain aspects of Van Geenhoven's approach to SI in West Greenlandic clearly generalize to the interpretation of morphosyntactic NI in other languages. Crosslinguistically, the incorporee in NI is scopally inert and can be interpreted as a nonspecific indefinite. However, as we have shown, the optimal account of SI must be flexible enough to allow for the attested diversity of incorporees in terms of discourse dynamics. Van Geenhoven also claims that SI extends beyond morphosyntactic NI to certain types of independent DP arguments, such as English bare plurals and German split topics. The investigation of SI distinct from morphosyntactic NI has been taken up by others since, as will be seen below.

3.2.3 Predicate restriction as a composition operation

Chung and Ladusaw (2004; henceforth C&L) develop an approach to semantic composition that enriches the inventory of basic composition operations that combine predicates with their arguments. They propose that an argument DP with property-type semantic content may in principle combine with its predicate in one of two modes.

In one mode, which C&L term *Specify*, the property supplied by the DP serves as input to a choice function (Reinhart 1997; Winter 1997; Matthewson 1999) that provides an entity that serves as argument to the predicate. In effect, Specify uses the property to restrict an individual variable that serves to saturate the argument parameter and thus reduce the valence of the predicate. Specify is shown applying to an internal argument in (45), where FA is the operation of function application, CF is the operation that type shifts a property to a choice function, and **f** represents a choice function.

(45) *Specify applied to the internal argument of a two-place predicate (see C&L 2004, 15)*
FA ($\lambda y \lambda x$ [Verb(x,y)], CF ([P(y)])) = $\exists \mathbf{f}$ λx [Verb(x,**f**(P))]

Alternatively, the property supplied by the DP may be combined with the predicate to restrict the argument parameter directly, leaving the valence of the predicate unaffected. This operation, which C&L term *Restrict*, does not saturate the argument.

(46) *Restrict applied to the internal argument of a two-place predicate (see C&L 2004, 10)*
Restrict ($\lambda y \lambda x$ [Verb(x,y)], P(y)) = $\lambda x \lambda y$ [Verb(x,y) $\wedge$ P(y)]

Assuming that composition eliminates all degrees of semantic incompleteness in predicates, compositions using Restrict ultimately must eliminate the restricted argument parameter, either through further specification or under general principles of existential closure.

As a basic composition operation, Restrict is recognizable as one aspect of the interpretation that Van Geenhoven gives for predicative indefinites in SI. The property expressed by the incorporee is used to restrict the internal argument parameter of the verb's meaning. Van Geenhoven's lexical analysis stipulates that the argument parameter is saturated by existential closure within the incorporating verb's meaning; see (34). In C&L's system, it is possible to view existential closure as a separate, non-lexical step in the semantic composition, subsequent to Restrict. However, the resulting constellation of semantic properties is intended to be the same as in Van Geenhoven's account.

The fact that Restrict does not alter the valence of the predicate also recalls Rosen's (1989) typology. C&L's use of Restrict to interpret the incorporee provides an account of Rosen's classifier NI, in which the semantic argument corresponding to the incorporee can be further restricted or ultimately specified by doubling with an independent DP.

C&L illustrate their framework with two case studies: object incorporation in Chamorro and the contrast between two indefinite determiners in Maori.

Like many other Austronesian languages, Chamorro has a version of morphosyntactic NI, illustrated below with the affixal verb *gäi-* 'have':

(47) Chamorro
a. Man-gäi-ga' häm.
AGR-have-pet we
'We have pets.'

(C&L 2004, 76)

b. Hayi gäi-patgun?
who? WH[NOM].AGR.have-child
'Who has a child?'

(C&L 2004, 76)

NI in Chamorro allows the incorporee to be doubled by an independent DP, as in (48):

(48) Chamorro

a. Gäi-ga' yu' kätu, lao matai.
AGR.have-pet I cat but AGR.die
'I had a pet cat, but it died.'

(C&L 2004, 76)

b. Hayi gäi-patgun hao?
who? WH[NOM].AGR.have-child you
'Whose child are you (lit. Who child-has you)?'

(C&L 2004, 76)

Under C&L's analysis, the independent DP that doubles the incorporee is not a syntactic direct object of the complex verb, but the VP has the interpretation expected if the DP's meaning is composed via further restriction or specification of the argument parameter restricted by the incorporee.

C&L's second case study concerns two indefinite articles in Maori, *he* and *tētahi*. These articles, which occur as the heads of syntactically independent DPs, are largely truth-conditionally interchangeable. However, *he* shows the scope limitations characteristic of SI: it must take narrow scope with respect to negation, modals, and other quantificational operators in the clause.

C&L analyze the contrast between *he* and *tētahi* in terms of their augmented theory of composition operations. Under their analysis, DP's headed by *he* are indefinites composed by Restrict; they involve SI. In contrast, DPs headed by *tētahi* are specific indefinites composed by the saturating operation Specify.

DPs headed by *he* or *tētahi* function as novel indefinites in terms of discourse reference. However, they contrast in terms of their topical salience in narrative. The characters introduced into the discourse by *he* DPs are generally nameless "and do not persist in the narrative beyond one or two subsequent mentions" (C&L 2004, 66). This is reminiscent of Mithun's (1984, 859) discussion of the use of morphosyntactic NI to background information in discourse.

3.2.4 SI in Discourse Representation Theory

Farkas and De Swart (2003; henceforth F&DS) provide a framework for SI embedded within Discourse Representation Theory (DRT). Their investigation focuses on the interpretation of a class of reduced DPs in Hungarian, and the interaction of the scopal inertness of SI with discourse dynamics and the interpretation of plurality.

F&DS point out the importance of distinguishing between two uses of variables in DRT: first, to represent the *thematic arguments* of the verb, and second, to represent discourse referents in the building of sentence-level discourse structures. As the meaning of a verb composes with the meanings of its DP arguments, the predicate's thematic arguments are replaced through instantiation by discourse referents introduced by the argument DPs. These discourse referents are the basis on which F&DS's analysis of SI is constructed.

F&DS (2003, 12) illustrate SI in Hungarian with the examples in (49):

(49) Hungarian
a. Mari olvas egy verset.
Mari read a poem.ACC
'Mari is reading a poem.'
b. Mari verset olvas.
Mari poem.ACC read
'Mari is reading a poem/poems.'

In (49a) the verb's internal argument is a direct object DP that is inflected for case and number. In contrast, in (49b) the verb's internal argument is a bare singular noun which immediately precedes the verb and is inflected for case but, in effect, uninflected for number. The gloss of (49b) reflects the fact that this bare noun involves SI: its semantic contribution is number neutral, serving only to restrict the thematic argument associated with the direct object.

Hungarian nominals in immediate preverbal position exhibit the scopal inertness emblematic of SI. Nouns like *verset* 'poem(s)' in (49b) will always have scope inside negation, modals, and any other quantificational elements within the clause. They also follow the pattern of morphosyntactic NI (or pseudo-NI) in showing reduced morphosyntactic structure: they are NPs but not DPs, and potentially unmarked for number. F&DS (2003, 90–92) argue that these NPs, which they analyze as semantic incorporees, *must* be morphosyntactically reduced: they may include nominal modifiers, but not articles. No restrictions are placed on their grammatical relation. Under certain conditions, a semantic incorporee can be the subject of a stage-level predicate and (presumably) an external argument, as illustrated in (50):[15]

(50) Hungarian
Gyerek sírt a közelben.
child cry.PAST the vicinity.in
'A child/Children was/were crying in the vicinity.'

(F&DS 2003, 10)

F&DS's analysis of SI assumes that semantic incorporees are composed with the verb's meaning through unification of their semantic content with the appropriate thematic argument of the verb. When the semantic incorporee is uninflected for number, there is nothing to trigger the instantiation of the thematic argument by a discourse referent. In this way, their account brings together the scopal inertness of SI with discourse opacity – the failure of the incorporee to individuate an entity and make it sufficiently salient to accommodate subsequent reference.

F&DS assume a presuppositional account of plural inflection on nouns to account for bare plurals in Hungarian. Plural inflection forces individuation and instantiation, and hence a degree of discourse transparency in Van Geenhoven's sense, regardless of whether the bare plural is a full DP or a semantic incorporee

in immediate preverbal position. As a result, the discourse contributions of (49a) and (49b) contrast with the discourse contribution of (51):

(51) Hungarian
Mari verseket olvas.
Mary poem.PL.ACC read
'Mari is reading poems.'

(F&DS 2003, 12)

Plural inflection on the semantic incorporee in (51) is sufficient to support subsequent anaphoric reference by a pronoun, but does not alter the incorporee's scopal inertness. This semantic contrast in Hungarian between bare singulars and nominals inflected for the plural follows the pattern discussed by Dayal (2011) for Hindi.

4 Coda

One unifying thread that runs through our discussion of the semantics of NI is predicate restriction, a conceptually minimal semantic operation that relates an argument parameter of a verb or other predicate to nominal content. Predicate restriction can be viewed as independent of any additional impact on morphosyntax, semantic composition, or discourse dynamic potential. Taking this perspective allows us to understand typological discussions of NI as attempts to grapple with the extent to which predicate restriction is correlated, or inconsistent, with other aspects of the syntax–semantics interface.

In Mithun's (1984) and Rosen's (1989) typologies, a central question is how the predicate restriction that interprets an incorporee affects the possibility of integrating additional material with the argument parameter that has been restricted. This is the central distinction in Rosen's typology: compounding NI eliminates the possibility entirely, while classificatory NI leaves open the options of further modification or doubling. Rosen's typology is explicitly limited to lexicalist analyses of NI, and so semantic composition in stranding and doubling appear "subsequent" to the predicate's formation (and interpretation) in the lexicon.

As Rosen notes, West Greenlandic is a language that allows stranding but not doubling. Van Geenhoven's (1998) lexical analysis of West Greenlandic inherits the problem of "subsequent" construal. In West Greenlandic, stranded modifiers of the incorporee do not affect the scopal inertness that is ensured by lexical binding of the internal argument parameter. The meanings of these modifiers must be semantically composed in such a way that doubling by a full DP is not allowed. This is an area in which more contemporary assumptions about the interface between morphosyntax and semantics might well improve the analysis, allowing for stranding without creating the possibility of doubling.

A second thread running through the discussion has been the independence of predicate restriction from discourse dynamic potential. The current literature on SI focuses on the interpretation of incorporees as nonspecific indefinites, unrelated to prior discourse. But as has been known at least since Mithun (1984), there are

languages (e.g., Chukchi, Mapudungan, and Nahuatl) in which the incorporee in morphosyntactic NI can be discourse-familiar.

F&DS join Mithun in assuming that the predicate restriction associated with SI does not provide individuation sufficient to support later discourse reference. In their system, the unification with a thematic argument that interprets a semantic incorporee does not provide the basis for discourse reference. But as the facts of plurals in Hindi and Hungarian indicate, even when a semantic incorporee is composed by predicate restriction, its morphological elaboration may permit it to accommodate subsequent pronominal reference.[16] In that regard, it would be interesting to ask whether the discourse transparency of West Greenlandic incorporees is correlated with the possibility of stranding. More generally, none of the accounts discussed here gives a fully satisfactory account of the range of discourse contributions made by incorporees in morphosyntactic NI (or, for that matter, SI). This too is an area that deserves further investigation.

Notes

1. Examples are presented in the orthography and glossing conventions used in the references cited. See these references for information about orthography, glosses, morphophonemic alternations (e.g., *lohs* vs *los* 'mat' in (1)–(2)), and so on.
2. The incorporee can also be an affix; see Gerdts (1998) on Halkomelem.
3. The incorporating verb can be transitive or unaccusative when the incorporee is a possessed N. Then the possessor, which is stranded, raises to become the object when the incorporating verb is transitive or the subject when the incorporating verb is unaccusative (Baker, Aranovich, and Golluscio 2005, 166–167).
4. NI of a complex N is less common when the incorporee is not an internal argument (Spencer 1995, 481).
5. In Chukchi, NI of the internal argument of a transitive verb can strand a possessor, in which case the possessor is realized as the direct object (Spencer 1995, 450). This construction could be viewed as a type of applicative.
6. See Gronemeyer (1996) for a different view. For perspicacity, the suffixes treated here as obligatorily incorporating verbs (= the suffixes that participate in denominal verb formation) are glossed as verbs rather than grammatical formatives in the examples in the text; for example, *-ta* is glossed 'make', not 'CAUS'.
7. The relevant principles are Travis' (1984) Head Movement Constraint and Baker's (1988) Uniformity of Theta Assignment Hypothesis.
8. Her claim is that languages with Type II incorporation also have Type I incorporation; languages with Type III also have Types I and II; and languages with Type IV also have the other three types.
9. Mithun's suggestion that Type III incorporation may be limited to polysynthetic languages suggests that the discourse linking is mediated by the system of pronominal arguments, and so predicate restriction is not inconsistent with discourse familiarity or even further specificity of reference.
10. Rosen notes that her typology cannot account for languages that allow stranding but not doubling.

    The question of how NI is related to lexical and syntactic notions of productivity has been contentious from the earliest work on the topic. When assessing the extent to which NI is productive in particular languages, it is important to keep in mind that

consultants' reactions to new formations may be subject to an expectation that the compound should be sufficiently *nameworthy*. Nameworthiness may be grounded in social or cultural practices or temporarily justified by contextual relevance. Deriving NI through syntactic head movement requires some account of the semantic composition for the meaning of the complex verb. Analysis of the complex verb of NI as lexically derived needs an account of how a transparent meaning for it might be predicted from the meaning of its components.

Nonetheless, as Mithun notes (1984, 852), lexical compounds may take on meanings that are not compositionally transparent. Their regular use may be more specialized. The most nameworthy predicate might not be consistent with the full range of meanings of the constituents from which it is formed. The most common incorporees may be drawn from a reduced set of nouns that have general meanings or sociocultural salience. Whether such opacity in a given language is considered prima facie evidence for a lexicalist analysis or a side effect of a constructional meaning associated with NI may well depend upon the analyst's other theoretical commitments.

11. West Greenlandic does not fit neatly into Rosen's (1989) typology of NI, as Rosen herself discusses (1989, 305–308). Case-marking and agreement indicate that the complex verb of NI is intransitive, suggesting that West Greenlandic has compound NI. But under Rosen's typology, the possibility of stranding is taken as diagnostic of classifier NI, with the further prediction that doubling by a full DP might be possible. However, West Greenlandic does not allow the incorporee to be doubled by a full DP whose head N is overt (Sadock 1986, 28).
12. Baker, Aranovich, and Golluscio (2005) claim that the incorporee has a generic interpretation.
13. Baker, Aranovich, and Golluscio (2005, 146) observe that incorporees in Mohawk have the same discourse profile as in Mapudungun.
14. Other languages in which the incorporee has the same discourse profile as in Chukchi include Huahtla Nahuatl (Merlan 1976) and Koryak (Mithun 1984).
15. Other examples of semantically incorporated nominals that can be linked to the external argument include English bare plurals (Van Geenhoven 1998), Maori *he* indefinites (C&L 2004), and "incorporated" subjects in Turkish (Öztürk 2005).
16. See also the discussion of Spanish and Catalan bare nominals in Espinal and McNally (2011, 97).

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