

Incorporation beyond the object : Interpretation and compositionality in polysynthesis

Andrew McKenzie · University of Kansas

WCCFL 39 · April 10, 2021

1 Introduction

The interpretation of incorporation has gaps

We can fill those gaps with mediating relations

Whose necessity is evident when we look at non-object incorporation

These relations will help understand the structures requisite in complex verbs

The focus is on the Kiowa language of Oklahoma

Aim for breadth; more details in McKenzie (2019), McKenzie (2021)

2 The interpretation of incorporation is weakly compositional

The interpretation of incorporation is weakly compositional (Pirrelli 2002)

The meanings of the parts contribute to the meaning of the whole, but do not fully compose it.

Noun incorporation: A noun combines syntactically with a verb into a complex ‘word’ (Mithun 1984, Baker 1988)

- (1) Kalaallisut / West Greenlandic (Van Geenhoven 1998: 99)

Suluut **timmisartu**+ liur -puq
S.ABS **airplane**+ make-IND:INTR:3S
‘Suulut made an airplane.’

- (2) a. $\llbracket \text{timmisartu} \rrbracket = \lambda x_e \lambda w_w. \text{airplane}(x)(w)$ $\langle e, wt \rangle$

- b. $\llbracket liur \rrbracket = \lambda x_e \lambda e_s \lambda w_w. \text{make}(x)(e)(w)$ $\langle e, \langle s, wt \rangle \rangle$
 c. $\llbracket timmisartu+liur \rrbracket =$
 $\lambda e_s \lambda w_w. \exists x [\text{airplane}(x)(w) = 1 \ \& \ \text{make}(x)(e)(w) = 1]$ $\langle s, wt \rangle$

NB: We'll say "noun incorporation" even though there is undoubtedly more structure than a simple root, at least in some languages (Farkas & de Swart 2003, Barrie & Mathieu 2016).

3 Sourcing the existential quantifier

Van Geenhoven 1998: Semantic Incorporation. The verb lexically shifts to one that takes a property as its argument.

- (3) a. $\llbracket timmisartu \rrbracket = \lambda x_e \lambda w_w. \text{airplane}(x)(w)$ $\langle e, wt \rangle$
 b. $\llbracket liur \rrbracket = \lambda f_{et} \lambda e_s \lambda w_w. \exists x [f(x)(w) \ \& \ \text{make}(x)(e)(w)]$ $\langle et, \langle s, wt \rangle \rangle$
 c. $\llbracket timmisartu+liur \rrbracket =$
 $\lambda e \lambda w. \exists x [\text{airplane}(x)(w) \ \& \ \text{make}(x)(e)(w)]$ $\langle s, wt \rangle$

Also for pseudo-incorporation: Farkas & de Swart (2003), Dayal (2011)

Incorporated nouns usually have the following properties:

- The noun is number-neutral if morphological singular (2) can mean 'airplanes'
- It has low scope with respect to other quantifiers
- It is discourse transparent, introducing referents

However

- It closes off further modification and doubling
- it isn't likely in languages where IVs are open class

4 An alternate means of procuring a binder

Chung & Ladusaw 2006: Restrict. The noun conjoins with the verb (via range restriction).

- (4) hayi gáí +patgun si Carmen
 who have+child DET Carmen
 'Whose child is Carmen?' (lit. who child+has Carmen)

- (5) a. $\llbracket patgun \rrbracket = \lambda x_e. \text{child}(x)$ $\langle e, t \rangle$

- b. $\llbracket g\acute{a}i \rrbracket = \lambda x_e \lambda e_s. \text{have}(x)(e)$ $\langle e, st \rangle$
 c. $\llbracket g\acute{a}i+patgun \rrbracket = \lambda x_e \lambda e_s. \text{child}(x) \ \& \ \text{have}(x)(e)$ $\langle e, st \rangle$

- Does not require the lexicon
- Does not saturate the entity. Allows “doubling”, where a full DP is used with NI.
- But: Does not offer a source for the \exists
- Assumption: every element in the semantics is mapped to by an element in the LF

5 The process needs more to it

These processes were developed for object incorporation.
 Notwithstanding any formal composition problems,

McKenzie (2021) discusses these problems

they are empirically insufficient.

- Non-objects routinely incorporate – they need a thematic role

(6) Mohawk (Mithun 2004: 7)

wak- **kont'sher+** rh -on
 1S.PAT-**paint+** coat-STATIVE
 ‘I have paint-coated it/painted it.’

- Some nouns are intensional – they need a world binder

(7) Kiowa (field notes)

á= **cául***+ è+ bà -hèl
 3EMPS=**buffalo+** hunt+go.PFV-HSY
 ‘They went to hunt buffalo.’

EMP: empathetic animate plural
 (here, Kiowas)

- Sometimes they need both

(8) Kiowa (Watkins 1990: 417)

góm+ jágá á= dáumê gàu Ø= **báuláu***+ fâulè
 wind+grease 3SGS.3SGD=be.HSY and.SS 3SGA.3SGO=**butter+** eat:IPFV.HSY
 ‘He had mentholatum and was eating it like butter.’

*: tone lowered for rest of word

6 The gaps that need to be filled

There is also adverb incorporation and verb incorporation.

Semantically, these constructions are weakly compositional

They need pieces to fill in the gaps. For noun incorporation, those are:

- an existential quantifier over entities (often)
- a thematic role or other relation (often)
- a quantifier over possible worlds (*i.e.*, a modal) (sometimes)

Intuitively that makes sense: Incorporation is often modeled such that a nominal element lacking the necessary functional information in its own projections gets them from the verb's.

How does the verbal projection carry the nominal functional load?

7 Focus on non-object incorporation

This talk we focus on Kiowa language (kio)

- Endangered language of the Kiowa Tribe of Oklahoma
- Kiowa-Tanoan language (?)
- native speakers in the dozens maybe, all elderly
- several hundred heritage speakers

Ideal for this study because Kiowa generally bars object incorporation (with certain exceptions)

(9) Compare the placement of the object *káú* 'shawl':

- a. Belle àn **káú** Ø= àumàù
B. HAB shawl 3SGA.3SGO=make.IPFV

'Belle makes shawls.' (Adger et al. 2009)

- b. *Belle àn Ø= **káú***+ àumàù
B. HAB 3SGA.3SGO=**shawl**+ make.IPFV

káú 'shawl' triggers singular agreement

*: tone lowered for rest of word

Meanwhile, non-objects incorporate routinely and productively.

8 Non-object incorporation

Non-object incorporation corresponds to a free form as well.

- (10) The free form requires a postpositive
- a. **thópòt***-cà dè= áu*+ sàugà
shade -at 1SG.REFL=awhile+sit down.PFV
 'I sat down in the shade for a while'
- b. ***thópòt** dè= áu*+ sàugà
shade 1SG.REFL=awhile+sit down.PFV
- (11) The incorporated form cannot bear a postpositive
- a. dè= áu*+ **thòpòt***+ sàugà
 1SG.REFL=awhile+**shade**+ sit down.PFV
 'I sat down in the shade for a while'
- b. *dè= áu*+ **thòpòt***-cà+ sàugà
 1SG.REFL=awhile+**shade**- at+ sit down.PFV

⇒ The thematic role expressed is the event's location

9 Some other thematic roles

A wide variety of roles are attested, including but not limited to:

role	Kiowa	gloss	English
instrument	tó*+gòp	club+hit	'hit with a club'
goal	jò+bá-	house+go	'go home'
source	jó*+zòn-	shoe+remove from	'take out of a shoe'
natural cause	góm+qâubè-	wind+fall over	'fall over from the wind'
vehicle/means	kâu*+hò+chàn-	car+travel+arrive	'arrive by car'
source material	tháp+kàui*+àum-	[deer+hide]+make	'make out of buckskin'
affected body part	ául*+sò-	hair+brush	'brush x's hair'
similarity	màyí*+àgà	woman+be sitting.SG/DU	'be sitting like a woman'
kin relation	fábì*+qàu	brother+be lying.SG/DU	'be x's brother'
existential	sésè*+sàul	arrowhead+be set.SG/DU	'have an arrowhead in it'

In line with long-standing observations of oblique or non-object incorporation (Spencer 1995, Mithun 2004, i.a.).

10 Mediating relation, alternative numeration

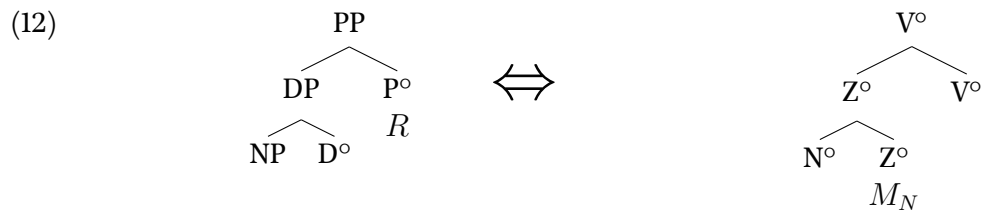
Q: How does a verbal complex provide the missing functional load?

A: A relation mediates between verb and noun

The relation (M_N) is hosted by a functional head inside the verb's projection, rather than by a dedicated head that projects adjuncts to the clause.

The difference begins in the numeration; instead of choosing P° to provide this information, the speaker chooses Z° .

We assume a base-generation account for the building of incorporates, at least for Kiowa.

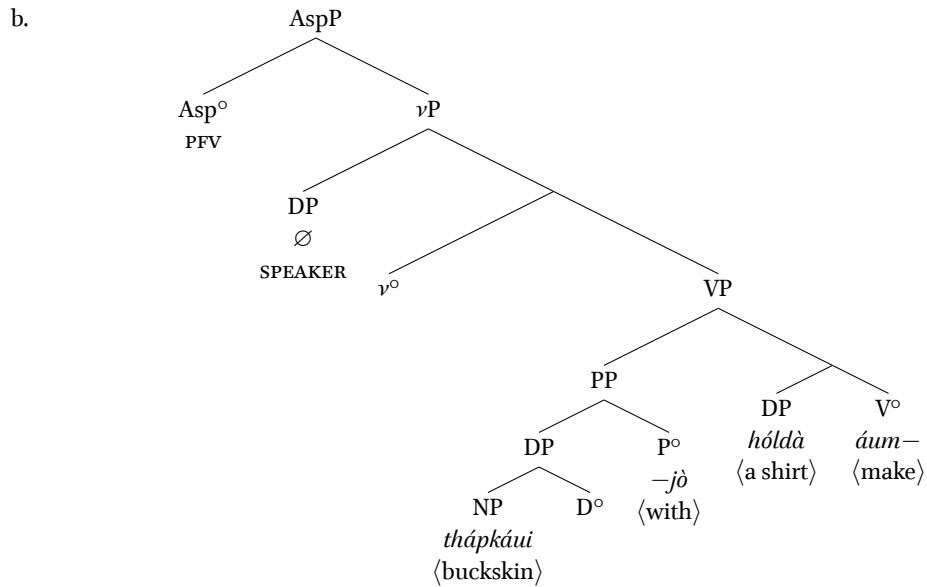


11 Material in the nominal domain

- (13) a. *tháp+káui*–jò* *hóldà gát=* *áumé*
 deer+hide –with_{inst} shirt 1SGA.3PLO=make.PFV

'I made a shirt with/out of buckskin.'

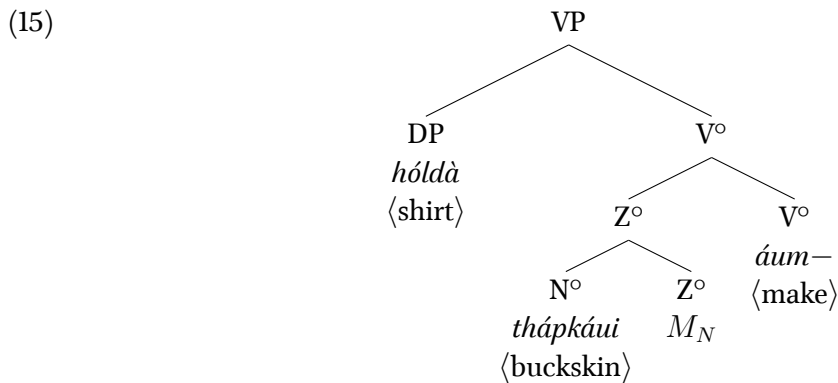
hóldà 'shirt' is lexically PL



12 Material in the verbal domain

- (14) a. *hóldà gát=* $\left[\begin{array}{l} \mathbf{tháp+káui*+} \\ \mathbf{deer+hide+} \end{array} \right]$ *áumé*
 shirt 1SG.3PL= [deer+hide+] make.PFV

'I made a shirt with/out of buckskin.'



13 The mediating relation

$$(16) \quad \llbracket M_N \rrbracket = \lambda P_{\text{ewt}} \lambda e_s \lambda w_w. \exists y [P(y)(w) = 1 \ \& \ \text{ROLE}(y)(e)(w) = 1] \quad \langle \langle e, wt \rangle, \langle s, wt \rangle \rangle$$

READ: *Given a property of entities, and event, and a world:*

There is an entity with that property playing a particular role in that event in that world

- The role is chosen contextually by the speaker. ROLE results from a choice function over the set of thematic roles.
- the selection is subject to semantic, pragmatic, and certain systematic exceptions that we will address

14 Composition with mediating relations

In the semantic interpretation, the noun is interpreted as an argument of M_N .

$$(17) \quad \lambda e_s \lambda w_w. \exists y [\text{buckskin}(y)(w) \ \& \ \text{ROLE}(y)(e)(w)]$$
$$\lambda x \lambda w. \text{buckskin}(x)(w) \quad \llbracket M_N \rrbracket$$

The result can conjoin with the verb through Event Identification (Kratzer 1996).

$$(18) \quad \lambda x_e \lambda e_s \lambda w_w. \text{make}(x)(e)(w) \ \& \ \exists y [\text{buckskin}(y)(w) \ \& \ \text{ROLE}(y)(e)(w)]$$
$$\lambda e_s \lambda w_w. \exists y [\text{buckskin}(y)(w) \ \& \ \text{ROLE}(y)(e)(w)] \quad \lambda x_e \lambda e_s \lambda w_w. \text{make}(x)(e)(w)$$

= (17)

The structure requires a relation or it is uninterpretable, rather than ungrammatical.

15 Limits on thematic roles

Agents cannot be selected by ROLE. Cross-linguistically the norm, thought to derive from height.

- | | |
|--|--|
| <p>(19) a. qáhí é= góp!
 man 3SGA.ISGO=hit.PFV
 'A man hit me!'</p> | <p>b. *é= qáhí*+ gòp!
 3SGA.ISGO=man+ hit.PFV</p> |
|--|--|

However, benefactive, comitatives, or recipients cannot be selected either (Barrie & Li 2015)

(20) Benefactive

- a. **cóm** gáu= áumé
friend 1SGA:3INVO:3SGD=make.PFV
 'I made it for a friend'
- b. *gáu= cóm+ áumé
 1SGA:3INVO:3SGD=**friend**+ make.PFV

INV: inverse number; here SG

(21) Receptive

- a. **cóm** áu= áu -jáu
friend 3SGA:3INVO:3SGD=give.PFV-MOD.VT
 'She will give it to a friend.'
- b. *áu= cóm+ áu -jáu
 3SGA:3INVO:3SGD=**friend**+ give.PFV-MOD.VT

(22) Comitatives employ conjunction anyways, let's set those aside.

- a. qáhî gàu á*-châu -dè è= chán
 man and 3P-mother-BAS 3DU=arrive.PFV
 'A man came with his mother.'
- b. *qáhî è= chàu* chán
 man 3DU=**mother**+ arrive.PFV

BAS: basic number; here SG

16 Limits to alternative numeration

Why agents, benefactives, and receptives? With NI, the thematic role is assigned by Z° , rather than by P° .

Rephrased: Why can't these roles be alternatively numerated ?

Answer: Features cannot be alternatively numerated on their own; only contentful heads can.

* * *

Barrie & Li (2015) suggest that the heads introducing these roles are linked to specific thematic roles, while a head like P° is not.

Agents are introduced by v° or Voice° which carries an agentive feature [AG], and assigns accusative case [ACC].

17 Restriction is not due to thematic restriction

But in Kiowa, benefactives and recipients are introduced by Appl° (Harbour 2003, 2008), along with possessors of objects, affected parties, the person you take something from, objects of locatives (like *tái* ‘on top’), and even subjects of out-of-control constructions— none of which can be incorporated.

Appl° does affect argument structure; it’s glossed as D ‘dative’ but applies to any of these roles.

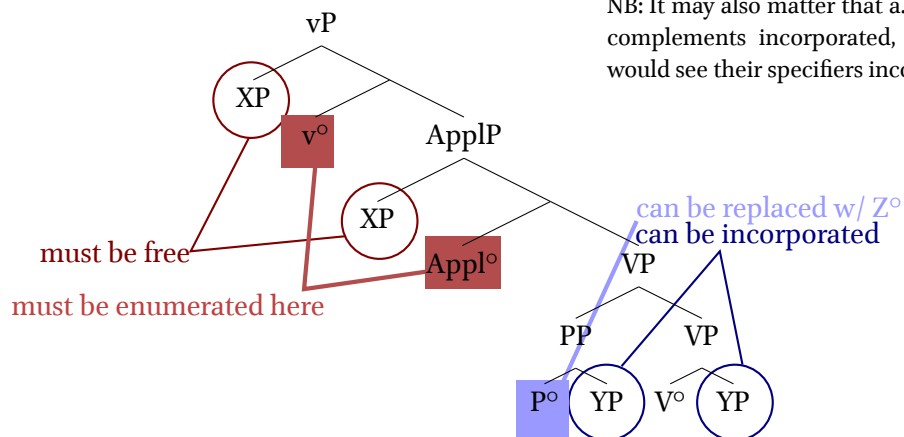
- (23) a. *báò nèn= fàu+ càunmàu*
 cat **ISGA:3DUO=** lead+bring.IPFV
 ‘I am bringing two cats.’
- b. *báò mén= fàu+ càunmàu*
 cat **ISGA:3DUO:2DUD=** lead+bring.IPFV
 ‘I am bringing you (2) guys two cats.’

18 Irreplaceable syntactic heads

Barrie & Li were on the right track: The way that a head provides thematic information matters. A P° head carries lexical content that assigns a thematic role. The Z° head replaces this content. v° and Appl° are dedicated to carrying thematic roles, but they are also generally devoid of overt content.

The heads are not alternatively numerated; their content is. There is no content in the heads besides the features themselves, yet those are linked to these heads.

(24)



19 ...what about objects?

Kiowa generally disallows incorporation of objects.

Why? M_N allows choice, restricted if the role cannot be alternatively numerated.

If that is what blocks Theme, how would object incorporation ever work, much less be common?

Thus, object incorporation cannot involve M_N . We need a different mechanism.

To see what that is, look at Kiowa

Kiowa actually does allow object NI productively in some environments

These will show that another mechanism is at play

One where the mediating relation sits above the verb, rather than below it.

20 Kiowa allows object incorporation

Kiowa generally disallows object incorporation but does allow it very easily in three specific structural contexts.

1. Derived lexical items
2. when the incorporating verb is embedded in a nominal
3. when the incorporating verb is itself incorporated, in control-like structures

exception	Kiowa	gloss	English
derived lexical item	ĩ+xó	offspring _c +put down.sg	'have a baby'
embedded in nominal	són _* +tà+qàudàl	grass+cut+vehicle	'lawn mower'
control-like	káu _* +àum+chàn	shawl+make+arrive	'come to make shawls'

Each of these independently require a mediating relation

That relation can bind the entity argument

21 Exception 1: Derived lexical items

A number of expressions involve object incorporation with 'nameworthy' phenomena (Mithun 1984)

The verb still shows agreement from the object.

- (25) Ø= ì+ xótjàu (26) gát= é+ zâuimàu
 3SGA.3SGO=**offspring**_c+ put down.SG.IPFV 1SGA.3PO=**bread**+ mash.IPFV
 ‘She is having a baby.’ (Harrington ‘I am kneading the dough.’
 1928: 85)

There is no structural reason NI should work here and not with other cases.

But their ‘nameworthiness’ suggests that interpretation matters.

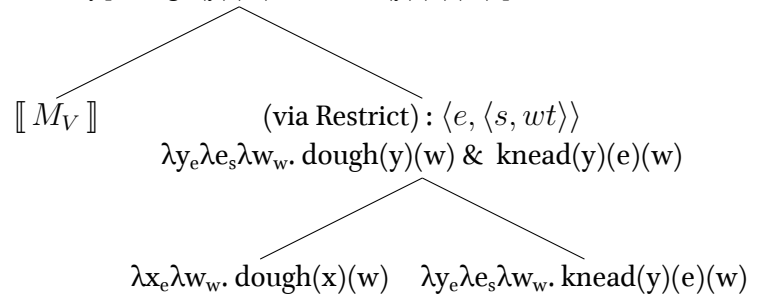
22 A verbal mediating relation

A mediating relation M_V takes the combined N+V and adds the quantifier.

N° can combine with the verb via Restrict or some other form of conjunction.

$$(27) \llbracket M_V \rrbracket = \lambda P_{e,swt} \lambda e_s \lambda w_w. \exists y [P(y)(e)(w) = 1] \quad \langle \langle e, swt \rangle, \langle s, wt \rangle \rangle$$

$$\llbracket M_V [dough knead] \rrbracket = \lambda e_s \lambda w_w. \exists y [dough(y)(w) \& knead(y)(e)(w)]$$



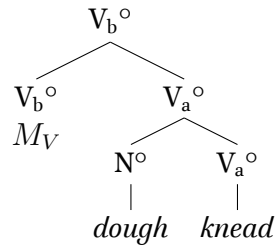
23 A categorizing head above the verb

M_V must be introduced by some syntactic head.

In this case, instead of a functional head that replaces P° , the head is categorizing.

As something becomes nameworthy, it becomes lexicalized. During the lexicalization process, a category head is added to the N+V complex.

(28)



NB: This structure is built in the syntax, not the lexicon

Speakers can store these in the lexicon, not to build with, but to compare against

24 Exception 2: Verbs embedded within nominals

M_V can also be used with a nominalizing head

overt nominal compounds

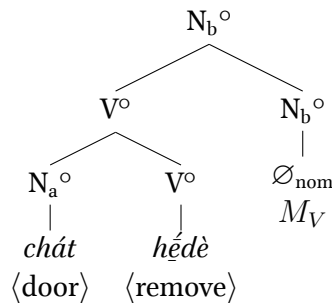
é+qú_*+jò	bread+set down.PL _c +house	'granary, silo'
són_*+tà+qàudàl	grass+cut+vehicle	'lawn mower'
tháp+é_*+qì	deer+hunt+man	'deer hunter'

non-overt nominal compounds

chát_*+tèdà	door+remove _c	'key'
dàum+zá	ground _c +shatter	'plow'
háu_*+cù	metal+strike _c	'telegraph' (later 'telephone')

Note the incorporated forms (_c), showing that there is some other head to the expression.

(29)



M_V is a complex relation in these cases. It has to take a verbal predicate, here the set of door-opening events, and provide a property of entities such that when the entity is used for its designed purpose, there are events with that predicate.

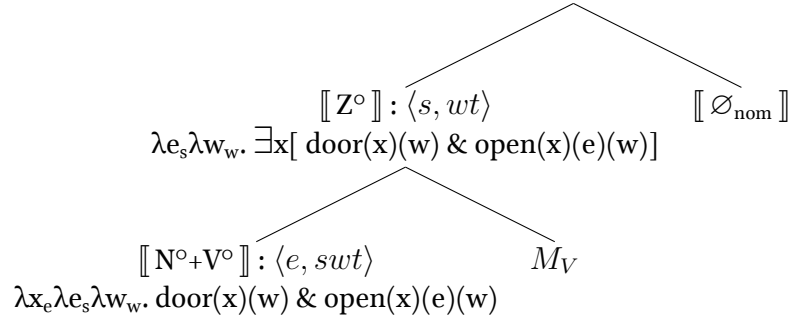
25 Decomposing complex relations

We can perhaps decompose this complexity at LF so that M_V quantifies over the entity argument, and the nominalizing \emptyset_{nom} adds the modal component.

- (30) a. $\llbracket \emptyset_{\text{nom}} \rrbracket = \lambda P_{e,swt} \lambda x_e \lambda w_w. \forall w' [\text{Circ}(w)(w') \ \& \ x \text{ is used for its purpose in } w' \rightarrow \exists e' [\text{instrument}(x)(e')(w') \ \& \ P(e')(w')]]$

READ: *In all circumstantial worlds where x is used for its purpose, there are events of P of which x is the instrument.*

- b. $\lambda y_e \lambda w_w. \forall w' [\text{Circ}(w)(w') \ \& \ y \text{ is used for its purpose in } w' \rightarrow \exists e' [\text{instrument}(y)(e')(w') \ \& \ \exists x [\text{door}(x)(w') \ \& \ \text{open}(x)(e')(w')]]]$



26 Exception 3: Verb under verb

A third exception that allows objects is when the verb is itself incorporated

- (31) Recall that incorporating objects is generally rejected

a. $\text{M}\grave{\text{a}}\text{y}\acute{\text{o}}\rho \quad \grave{\text{a}}\text{n} \quad \text{k}\acute{\text{a}}\text{u} \quad \acute{\text{a}}_* = \quad \grave{\text{a}}\text{u}\text{m}\grave{\text{a}}\text{u}$
 woman.INV HAB shawl 3EMPA.3SGO=make.IPFV

'The ladies make shawls.'

INV: inverse number, here plural
 EMP: empathetic plural

- b. $*\text{M}\grave{\text{a}}\text{y}\acute{\text{o}}\rho \quad \grave{\text{a}}\text{n} \quad \acute{\text{a}}_* = \quad \text{k}\acute{\text{a}}\text{u} + \quad \grave{\text{a}}\text{u}\text{m}\grave{\text{a}}\text{u}$
 woman.INV HAB 3EMPA.3SGO=shawl+ make.IPFV

- (32) The same incorporation works if the verb is incorporated (32b)

a. $\text{M}\grave{\text{a}}\text{y}\acute{\text{o}}\rho \quad \grave{\text{a}}\text{n} \quad \text{k}\acute{\text{a}}\text{u} \quad \acute{\text{a}} = \quad \acute{\text{a}}\text{u}\text{m} + \quad \text{ch}\acute{\text{a}}\text{n}\grave{\text{m}}\grave{\text{a}}$
 woman.INV HAB shawl 3EMPS=make+arrive.IPFV

'The ladies come to make shawls.'

- b. Màyóp àn á= káuw_{*}+ àum+ chànma
 woman.INV HAB 3EMPS=shawl+ make+arrive.IPFV
 'The ladies come to make shawls.'

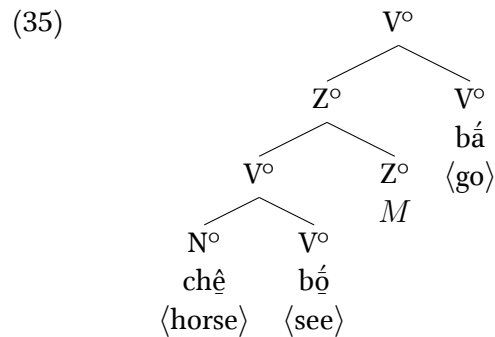
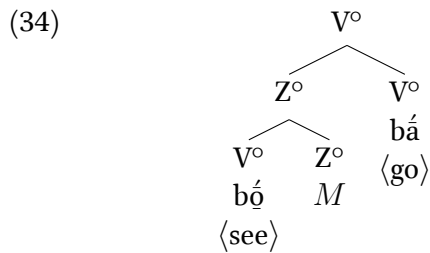
27 Control-like incorporation

This structure is 'control-like' in meaning (but lacks PRO)

The incorporated verb does not show in the main verb's argument structure, and its event is intensional; true in worlds where the subject's intent comes true

- (33) áuphâu á= fô_c+ bá, né háun gáu= bômâu
 out there 3EMPS=see_c+go.PFV but not 3EMPA.2SGO=see.NEG
 'They went there to see you, but they didn't see you.'

The incorporated verb does not share a world or event argument with the main verb → mediating relation (*M*) between them. This can bind an incorporated noun (35)



28 Medial sum-up

Let's take stock.

- The meaning of NI structures has gaps
- Nouns require a quantifier, a thematic role and sometimes a world binder
- Mediating relations fill these gaps

1. A relation between N and V

- supplied by alternative numeration
- provides a thematic role
- freely selected role, if a.n. is possible
- verbal functional heads, no a.n.
- so nouns with those roles don't incorporate

2. A relation above N+V

- supplied by a categorizing head in Kiowa
- perhaps light verbs as well (Johns 2007)
- or verbal mediating relation
- does not provide a thematic role
- licenses object incorporation

- Suggestion to follow up on: The availability of incorporation depends on the presence of these heads

29 Argument structure in object incorporation

The extra verbal head can help us understand a key point of variation in object incorporation

Cross-linguistically, languages vary as to whether object NI affects argument structure

In Kiowa and some languages object NI verbs are still transitive, but in many languages they become intransitive

(36) Transitive object NI: Southern Tiwa (Kiowa-Tanoan, New Mexico US)

a- diru+ k'ar-hi
2sA.3sO- chicken+eat -FUT

'You will eat the chicken' (Allen et al. 1984: 296)

(1) Intransitive object NI: Kalaallisut / West Greenlandic

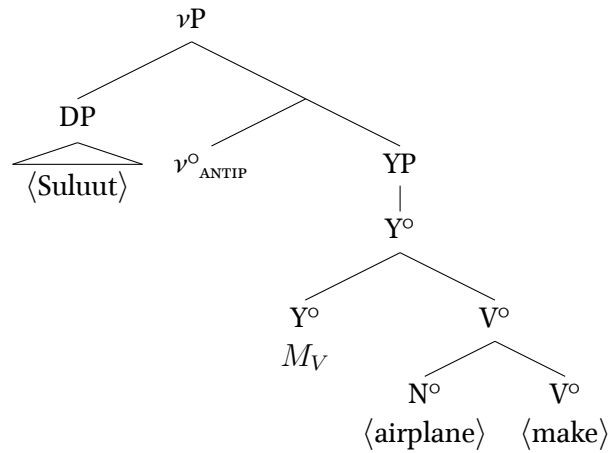
Suluut timmisartu+liur -puq
S.ABS airplane+ make-IND:INTR:3s

'Suulut made an airplane.' (Van Geenhoven 1998: 99)

30 Antipassive with NI

The ν° head calls for an agent but does not assign ACC case; the ‘antipassive’ in a broad sense (Polinsky 2017, Baker 1988, Rosen 1989, Coon 2017)

(37) (\simeq (1))



How is transitive object NI ruled out in these languages?

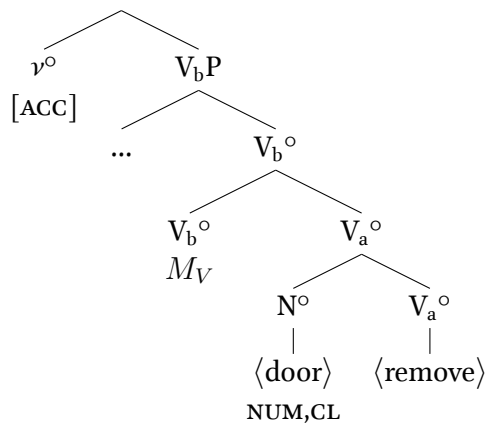
31 Preventing transitive incorporation

When transitive object incorporation occurs, the agentive ν° assigns [ACC] case, and the nominal triggers agreement features.

But what does ν° assign case to? The incorporated noun lacks functional material needed for receiving case.

(38) bé= chát_*+hèdè
 2SGA.3INV0=door+ remove.PFV.IMPER
 ‘open the door! / open the tipi flap!’

(39)

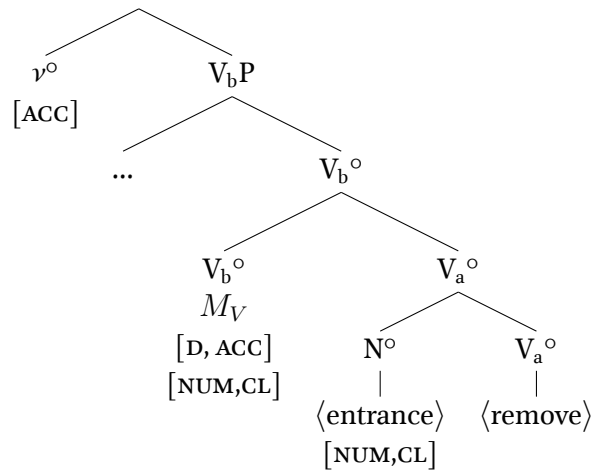


32 Verbal determiner features

With NI, the ‘verb’ bears the noun’s functional load.

The mediating head does the work of the determiner, so the mediating head is the target.

(40)



33 Forcing transitive or detransitive object NI

Case assignment and ϕ -feature transmission are linked to [D] features.

In a language where the categorizing head...

- can bear a [D] feature → object NI is transitive
- cannot bear a [D] feature → object NI is intransitive

With no [D]-bearing head to send case to, ν°_{AG} 's [ACC] would violate the Case Filter.

Only an agentive head with no case assigner is available— the antipassive.

34 Verb incorporation

Mediating relations can also help understand verb incorporation.

Verb incorporation is common in Kiowa

Manner modifiers are just conjunction, all the argument are shared

- (41) a. áuihyàu Ø= xóidé_{*} -hèl nègáu á_{*}= kùì+ hàfè -hèl
 there 3SGS=land.PFV-EVID and then.DS 3EMPA.3SGO=**drag**+raise.PFV-EVID
 ‘It fell there and they dragged it off.’ (Saumty, Goodnight Show)
 b. $\llbracket kùì+hàfè \rrbracket = \lambda x_e \lambda e_s \lambda w_w. \text{drag}(x)(e)(w) \ \& \ \text{raise}(x)(e)(w) \quad \langle e, \langle s, wt \rangle \rangle$

Ability modals and inchoatives seem to take verbal complements

- (42) yá= cùn_{*}+ ténxò+dàu (43) è= sál+ àumà
 3PLS:1SGD=**dance**_c+allow+be 3DUS=**be hot**+make.DETR.IPFV
 ‘I am allowed/permitted to dance.’ ‘They are catching a fever.’

the detransitive of ‘make’ = ‘become’

Some have more complicated semantics

- (44) á -dàu è= góm+ bôn_{*}+dàu (45) á= fò+ bá
 stick-INV 3INVS=wind+**bend**+be 3EMPS=**see**_c+go.PFV
 ‘The stick is bent from the wind.’ ‘They went to see you.’

35 Control-like incorporation

The subject of the embedded verb is ‘controlled’ by an argument of the main verb.

Resembles Landau (2015)’s logophoric control

- (46) èm= qájái_{*}+fò+ bá
 2SGS=chief+ **see**_c+go.PFV
 ‘You went to see the chief.’ \simeq subject control
 (47) èm= qí+ káu_{*}+jòtjàu
 1SGA.2SGO=firewood+**get**_c+ send.IPFV
 ‘I’m sending you to get firewood.’ \simeq object control

The embedded arguments do not affect the main verb’s argument structure, but can be overt

- (48) a. à= chán $\left[\begin{array}{l} \text{èm=} \quad \text{bó} \quad \text{-jáu}_* \quad \text{=dèfèdò} \\ \text{1SGS=arrive.PFV} \quad \left[\text{1SGA.2SGO=see.PFV-MOD.VT=in order to} \right] \end{array} \right]$
 ‘I have come to see you.’

- b. à= f₀+ chán
 1SGS=see_c+ arrive.PFV
 'I have come to see you/ him/ them/ her/ it'
- (49) a. zébàut é= áum -hèl
 arrow.INV 3SGA:3INV0=make.PFV-EVID
 'He made an arrow.'
- b. zébàut gà= áum+ máuhól -hèl
 arrow.INV 3SGA:3PLO=make+ prepare.PFV-EVID
 'He got ready to make an arrow.'

INV number is SG here

máuhól 'prepare' has PL obj

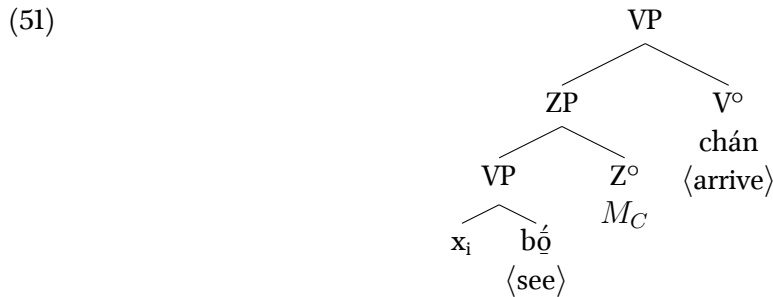
36 A 'control' mediating relation

The verb's event and world arguments need binders

The entity argument needs to be linked to a matrix argument

Mediating relation between V and VP (M_C)

- (50) ám/qáhî à= f₀+ chán
 you/man 1SGS=see_c+arrive.PFV
 'I have come to see you/ (a/the) man.'



What does this M_C relation contain? There is an attitude associated with the main event, and if the content of that attitude holds, the embedded VP does, too.

- (52) Purpose relation and associated attitudes
- Associated attitude**
 For any event e , let a_e be an attitude associated with e , held by the agent or acting participant of e .
 - Content relation**
 For any worlds w, w' , $\text{Cont}_w(a_e)(w') = 1$ iff w' is compatible with the content of a_e in w .

c. **Mediating relation**

$\llbracket M_C \rrbracket = \lambda P_{s,wt} \lambda e_s \lambda w_w. \forall w' [\text{Cont}_w(a_e)(w') \rightarrow \exists e' [\text{the agent of } e' = \text{the holder of } a_e \ \& \ P(e')(w')]]$

READ: *In all worlds where the attitude content associated with e comes true, there's an event whose agent is that attitude's holder, which has the property P*

d. $\llbracket \grave{a} \acute{f}\acute{o}c h\acute{a}n \rrbracket =$ I arrived, and in all worlds where the attitude content associated with that arrival comes true, there's an event of seeing you whose agent is that attitude's holder

37 A 'tough' mediating relation

(53) á -dàui è= tēm_{*}+ còt
stick-INV 1INV S=break+ be hard

'The stick is hard to break.'

INV here = SG

Recent accounts of *tough*: A modal operator introduces a judge and binds arguments in embedded clause (Keine & Poole 2017, Gluckman 2018)

(54) The stick is tough Op₁ [PRO to break x₁] \simeq The stick is such that if someone tried to break it, such an event would be tough to accomplish.

McKenzie (2019): A state with an associated attitude allows for a judge

(55) **Defining a 'special state'**

$\text{SpSt}(x) = \{ \langle s, w \rangle \mid s \text{ is a state that holds of } x \text{ in } w, \text{ and } \exists b [b = a_s] \}$

(56) **Tough predicates include a judge argument and take events**

$\llbracket \acute{c}\acute{o}t \rrbracket = \lambda e_s \lambda j_e \lambda s_s. \lambda w_w. \text{tough}(e)(j)(s)(w)$

READ: *s is a state of e being strong according to j in w.*

(57) **The toughness-mediating relation**

$\llbracket M_T \rrbracket = \lambda P_{e,swt} \lambda Q_{s,wt} \lambda x_e \lambda s_s \lambda w_w. \text{SpSt}(x)(s)(w) \ \& \ \forall w' \left[\begin{array}{l} w' \in \text{content}_w(a_s) \rightarrow \\ \forall e [P(x)(e)(w') \rightarrow Q(e)(\text{holder}(a_s))(w')] \end{array} \right]$

READ: *s is a state of x such that in all worlds w' where a relevant judgment in w is accurate, any event of P involving x in w' is Q according to the holder of a_s.*

38 Do complement verbs need mediating relations?

Decomposed attitude predicates (Kratzer 2006, Moulton 2009)

The modal is below the attitude verb, which mainly supplies the modal base

(58) *Sam believes that it is raining*

(59) classic version (Karttunen)

a. $\llbracket \textit{believe} \rrbracket = \lambda p_{wt} \lambda x_e \lambda w_w. \forall w' [\text{Dox}_x(w)(w') \rightarrow p(w')]$ $\langle wt, \langle e, wt \rangle \rangle$

b. $\llbracket \textit{that} \rrbracket = \lambda p. p$

(60) decomposed version (Kratzer)

a. $\llbracket \textit{believe} \rrbracket = \lambda x_e \lambda s_s \lambda w_w. \text{believe}(x)(s)(w)$ $\langle e, \langle s, wt \rangle \rangle$

b. $\llbracket \textit{that}_{log} \rrbracket = \lambda p_{wt} \lambda x. \forall w' [\text{compatible}(x)(w') \rightarrow p(w')]$

c. $\llbracket \textit{that}_{fact} \rrbracket = \lambda p_{wt} \lambda e. p \text{ exemplifies } e$

Essentially, the complementizer hosts a mediating relation, or some head in that layer (cp. Landau (2015)'s operator with logophoric control).

39 Decomposing VI with attitudes

Incorporation with these predicates can work likewise.

The attitude holder in Kiowa is typically Applicative, so not an argument of the verb.

(61) $\acute{e} = \text{c}\acute{\text{u}}\text{n}_{*+} \text{t}\acute{\text{e}}\text{n}\acute{\text{d}}\acute{\text{a}}\text{u}$
 3SGS.lSGD=dance_c+want
 'I want to dance'

If $\langle \textit{want} \rangle$ has a simple meaning, then M_C can be used

(62) $\llbracket \textit{t}\acute{\text{e}}\text{n}\acute{\text{d}}\acute{\text{a}}\text{u} \rrbracket = \lambda s_s \lambda w_w. \text{want}(s)(w)$ $\langle s, wt \rangle$

(63) $\llbracket \textit{c}\acute{\text{u}}\text{n}\text{t}\acute{\text{e}}\text{n}\acute{\text{d}}\acute{\text{a}}\text{u} \rrbracket = \lambda s_s \lambda w_w. \text{want}(s)(w) \ \& \ \forall w' [\text{Cont}_w(a_s)(w') \rightarrow \exists e' [\text{the agent of } e' = \text{the holder of } a_s \ \& \ \text{dance}(e')(w')]]$

READ: *s is a state of wanting, and in all worlds compatible with the content of the attitude associated with that wanting, there is a dancing event whose agent is the wanter*

40 Other kinds of complex predicates

Do other complex predicates work with or require mediating relations?

Some restructuring involve multiple clauses, while others involve V+VP structure, where the embedded VP lacks functional material Wurmbrand (2015)

The latter is diagnosed with long object movement/long passive construction (which does not apply in Kiowa)

- matrix subject raised from theme of embedded verb
- matrix verb is passive
- embedded verb is infinitival

(64) Japanese (Kubota 2014: 1172)

sono hon -wa ooku -no hito -ni yon -te mi-rare -ta
that book-TOPIC many-GEN person-DAT read-TE try-PASSIVE-PAST
lit.: 'That book was attempted to read by many people'

(65) German (Wurmbrand 2015: 251)

dass der Traktor und der Lastwagen zu reparieren versucht wurden
that [the tractor and the truck].NOM to repair.INF tried were.PASSIVE.PL
'that they tried to repair the tractor and the truck'

41 Restructuring

Different approaches to these (Kubota 2014, Keine & Bhatt 2016), which involve linking the two verbs.

However, with mediating relations, we get the same result. The matrix verb does not have carry the functional load of what is being incorporated

The morphology raises an intriguing question.

Restructuring verbs are marked for non-finiteness.

Often they are introduced by 'dummy' prepositions

These are ignored in semantic accounts

Like with attitude verbs, perhaps these bear the mediating relation

42 Final summary

To make a long story short:

- Filling out the semantics of incorporation requires mediating relations
- These relations require structure to host them.
- This structure helps us understand certain incorporation and complex verb phenomena.

Many questions left on the table:

- What kinds of relations will we see cross-linguistically?
- Are the relations too powerful, or should they be distributed?
- Can they be put into the verb or the noun? (cp. Gehrke & Lekakou (2013))
- How much structure *is* there in a complex predicate?
- What happens as we decompose verbs and nouns into bare roots?

* * * Thank you * * *

43 Acknowledgements

This work was supported by a grant (#BCS-1664431) from the Documenting Endangered Languages program, a joint effort by the National Science Foundation and the National Endowment for the Humanities. It relied on the gracious and patient help from Dorothy Whitehorse Delaune, Delores Harragarra, and Juanita Ahtone, along with unflinching aid from Joe Dupoint, Darren Zotigh, Amie Tah-Bone, and the Kiowa Language and Culture Revitalization Program.

This work has been improved by the feedback and advice of audiences of previous versions and parts of this work, at the University of Kansas, the University of Arizona, SULA 10, and WCCFL 36. Thanks also to anonymous reviewers at every step along the way.

Jé àhòdè bát áu!

References

- Adger, David, Daniel Harbour & Laurel Watkins. 2009. Mirrors and Microparameters: Phrase structure beyond free word order. Cambridge Univ. Press.
- Allen, Barbara J., Donna B. Gardiner & Donald G. Frantz. 1984. Noun incorporation in southern tiwa. International Journal of American Linguistics 50(3). 292–311.
- Baker, Mark. 1988. Incorporation: A theory of grammatical function changing. Chicago: University of Chicago Press.
- Barrie, Michael & Audrey Li. 2015. The semantics of (pseudo) incorporation and case. In Olga Borik & Berit Gehrke (eds.), The syntax and semantics of pseudo-incorporation, Leiden: Brill. doi:10.1163/9789004291089_006.
- Barrie, Michael & Éric Mathieu. 2016. Noun incorporation and phrasal movement. Natural Language & Linguistic Theory 34(1). 1–51. doi:10.1007/s11049-015-9296-6.
- Coon, Jessica. 2017. Little v° agreement and templatic morphology in Ch'ol. Syntax 20(2). 101–137. doi:10.1111/synt.12135.
- Dayal, Veneeta. 2011. Hindi pseudo-incorporation. Natural Language & Linguistic Theory 29(1). 123–167. doi:10.1007/s11049-011-9118-4.
- Farkas, Donka & Henriëtte de Swart. 2003. The semantics of incorporation. Stanford, CA: CSLI Publications.
- Gehrke, Berit & Marika Lekakou. 2013. How to miss your preposition. Studies in Greek Linguistics 33. 92–106.
- Gluckman, John. 2018. Perspectives on syntactic dependencies. Los Angeles, CA: University of California at Los Angeles dissertation.
- Harbour, Daniel. 2003. The Kiowa case for feature insertion. Natural Language and Linguistic Theory 21. 543–578.
- Harbour, Daniel. 2008. Morphosemantic number: From Kiowa noun classes to UG number features. Dordrecht: Springer.
- Harrington, John Peabody. 1928. Vocabulary of the Kiowa Language, vol. Bulletin 84. Washington, D.C.: Bureau of American Ethnology.
- Johns, Alana. 2007. Restricting noun incorporation: Root movement. Natural Language and Linguistic Theory 25(3). 535–576.
- Keine, Stefan & Rajesh Bhatt. 2016. Interpreting verb clusters. Natural Language & Linguistic Theory 34(4). 1445–1492. doi:10.1007/s11049-015-9326-4.
- Keine, Stefan & Ethan Poole. 2017. Intervention in *tough*-constructions revisited. The Linguistic Review 34(2). 295–330.

- Kratzer, Angelika. 1996. Severing the external argument from its verb. In Laurie Zaring Johanson Rooryck (ed.), Phrase structure and the lexicon, 109–137. Dordrecht: Kluwer.
- Kratzer, Angelika. 2006. Minimal pronouns. MS. University of Massachusetts Amherst.
- Kubota, Yusuke. 2014. The logic of complex predicates: A deductive synthesis of ‘argument sharing’ and ‘verb raising’. Natural Language and Linguistic Theory 32. 1145–1204.
- Landau, Idan. 2015. A two-tiered theory of control. MIT Press.
- McKenzie, Andrew. 2019. Kiowa verb incorporation and types of mediating relations. In Alex Goebel & Kimberly Johnson (eds.), Proceedings of the 10th conference on the Semantics of Underrepresented Languages of the Americas (SULA 10), Amherst, Mass.: GLSA.
- McKenzie, Andrew. 2021. Mediating relations and the semantics of noun incorporation. Natural Language and Linguistic Theory 52. doi:10.1007/s11049-021-09511-4.
- Mithun, Marianne. 1984. The evolution of noun incorporation. Language 60(4). 847–894.
- Mithun, Marianne. 2004. The non-universality of obliques. Presented at Syntax of the World's Languages.
- Moulton, Keir. 2009. Natural selection and the syntax of clausal complementation. Amherst, Mass.: University of Massachusetts Amherst dissertation.
- Pirrelli, Vito. 2002. Per un superamento della dicotomia lessico-grammatica. aspetti di composizionalità ‘debole’ nel linguaggio. In Elena Ferrario & Virginia Pulcini (eds.), La lessicografia bilingue tra presente e avvenire, 187–203. Vercelli, Italy: Edizioni Mercurio.
- Polinsky, Maria. 2017. Antipassive. In Lisa Demena Travis Jessica Coon, Diane Massam (ed.), The Oxford handbook of ergativity, Oxford U. Press. doi:10.1093/oxfordhb/9780198739371.013.13.
- Rosen, Sara Thomas. 1989. Two types of noun incorporation: A lexical analysis. Language 65(2). 294–317. doi:10.2307/415334.
- Spencer, Andrew. 1995. Incorporation in chukchi. Language 71(3). 439–89. doi:10.2307/416217.
- Van Geenhoven, Veerle. 1998. Semantic incorporation and indefinite descriptions. Stanford, CA: CSLI.
- Watkins, Laurel J. 1990. Noun phrase versus zero in Kiowa discourse. IJAL 56(3). 410–426.
- Wurmbrand, Susi. 2015. Complex predicate formation via voice incorporation. In Léa Nash & Pollet Samvelian (eds.), Approaches to complex predicates, 248–290. Leiden, the Netherlands: Brill.