Incorporation beyond the object: Interpretation and compositionality in polysynthesis

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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. \[ \text{timmisartu} \] = \( \lambda x \lambda w \cdot \text{airplane}(x)(w) \)
   \( \langle e, wt \rangle \)

b. \[ \text{liur} \] = \( \lambda x \lambda e \lambda s \lambda w \cdot \text{make}(x)(e)(w) \)
   \( \langle e, \langle s, wt \rangle \rangle \)

c. \[ \text{timmisartu+liur} \] = 
   \( \lambda e \lambda s \lambda w \cdot \exists x \left[ \text{airplane}(x)(w) = 1 \& \text{make}(x)(e)(w) = 1 \right] \)
   \( \langle s, wt \rangle \)

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)  
\[ \text{a. } \text{[timmisartu]} = \lambda x \lambda w. \text{airplane}(x)(w) \quad \langle e, wt \rangle \] 
\[ \text{b. } \text{[liur]} = \lambda f \lambda e \lambda s \lambda w. \exists x [ f(x)(w) \& \text{make}(x)(e)(w) ] \quad \langle et, \langle s, wt \rangle \rangle \] 
\[ \text{c. } \text{[timmisartu+liur]} = \lambda e \lambda w. \exists x [ \text{airplane}(x)(w) \& \text{make}(x)(e)(w) ] \quad \langle s, wt \rangle \]

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
- 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. \[ \text{patgun} \] = \( \lambda x_e. \text{child}(x) \) \quad \langle e, t \rangle
    b. \[ gáí \] = \( \lambda x_e \lambda e_s. \text{have}(x)(e) \) \quad \langle e, st \rangle
    c. \[ gáí+patgun \] = \( \lambda x_e \lambda e_s. \text{child}(x) \& \text{have}(x)(e) \) \quad \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, they are empirically insufficient.

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

(6) Mohawk (Mithun 2004: 7)

\[
\text{wak– kont’sher+ rh –on}\]
\[
\text{ls.PAT–paint+ coat–STATIVE}
\]

‘I have paint-coated it/painted it.’

- Some nouns are intensional – they need a world binder

(7) Kiowa (field notes)

\[
\text{á= cául+ è+ bà –hèl}\]
\[
\text{3EMPS=buffalo+ hunt+go.PFV–HSY}
\]

‘They went to hunt buffalo.’
5 The process needs more to it

· Sometimes they need both

(8) Kiowa (Watkins 1990: 417)

\[ \text{góm} + \text{jágá} \; \text{á=} \; \text{dáumê} \; \text{gàu} \; \varnothing = \; \text{báuláu} + \; \text{fàulè} \]

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?
Focus on non-object incorporation

This talk we focus on Kiowa language (kio)

- Endangered language of the Kiowa Tribe of Oklahoma
- Kiowa-Tanoan language (Harrington 1910, Hale 1967, Sutton 2014)
- 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 k̓áu ‘shawl’:

a. Belle àn k̓áu ∅= âumàu
   B. HAB shawl 3SGA.3SGO=make.IPfv
   ‘Belle makes shawls.’ (Adger et al. 2009)

b. *Belle àn ∅= k̓áu+_ âumàu
   B. HAB 3SGA.3SGO=shawl+ make.IPfv

Meanwhile, non-objects incorporate routinely and productively.
Non-object incorporation corresponds to a free form as well.

(10) The free form requires a postpositive

a. thópòt,–cà dè= āu.+ sàugà
   shade –at 1sg.refl=awhile+sit down pfv
   ‘I sat down in the shade for a while’

b. *thópòt dè= āu.+ sàugà
   shade 1sg.refl=awhile+sit down pfv

(11) The incorporated form cannot bear a postpositive

a. dè= āu.+ thòpòt+ sàugà
   1sg.refl=awhile+shade+ sit down pfv
   ‘I sat down in the shade for a while’

b. *dè= āu.+ thòpòt,–cà+ sàugà
   1sg.refl=awhile+shade– at+ sit down pfv

⇒ The thematic role expressed is the event’s location
### Some other thematic roles

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

<table>
<thead>
<tr>
<th>role</th>
<th>Kiowa</th>
<th>gloss</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>instrument</td>
<td>tó̍,+gòp</td>
<td>club+hit</td>
<td>‘hit with a club’</td>
</tr>
<tr>
<td>goal</td>
<td>jò̍,+bā̍–</td>
<td>house+go</td>
<td>‘go home’</td>
</tr>
<tr>
<td>source</td>
<td>jó̍,+zòn–</td>
<td>shoe+remove from</td>
<td>‘take out of a shoe’</td>
</tr>
<tr>
<td>natural cause</td>
<td>góm+qâubè̍–</td>
<td>wind+fall over</td>
<td>‘fall over from the wind’</td>
</tr>
<tr>
<td>vehicle/means</td>
<td>kâu̍,+hò̍+chàn–</td>
<td>car+travel+arrive</td>
<td>‘arrive by car’</td>
</tr>
<tr>
<td>source material</td>
<td>tháp+kàui̍,+àum–</td>
<td>[deer+hide]+make</td>
<td>‘make out of buckskin’</td>
</tr>
<tr>
<td>affected body part</td>
<td>ául̍,+sò̍–</td>
<td>hair+brush</td>
<td>‘brush x’s hair’</td>
</tr>
<tr>
<td>similarity</td>
<td>màyí̍,+àgà</td>
<td>woman+be sitting.SG/DU</td>
<td>‘be sitting like a woman’</td>
</tr>
<tr>
<td>kin relation</td>
<td>fâbî̍,+qâu</td>
<td>brother+be lying.SG/DU</td>
<td>‘be x’s brother’</td>
</tr>
<tr>
<td>existential</td>
<td>sèsè̍,+sàul</td>
<td>arrowhead+be set.SG/DU</td>
<td>‘have an arrowhead in it’</td>
</tr>
</tbody>
</table>

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 \((MN)\) 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 \(P^o\) to provide this information, the speaker chooses \(Z^o\).

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

(12)

\[
\begin{align*}
\text{PP} & \quad \text{DP} \\
\text{NP} & \quad \text{D}^o \\
\end{align*}
\quad \Leftrightarrow
\quad
\begin{align*}
\text{Z}^o & \quad \\
\text{N}^o & \quad \\
\end{align*}
\]

\[
\begin{align*}
\text{V}^o & \quad \\
\end{align*}
\]

\[
\begin{align*}
\text{P}^o & \quad \text{R} \\
\end{align*}
\]
11 Material in the nominal domain

(13) a. **tháp+kái unified-deer+hide -with inst shirt ISGA.3PL=make.PFV**

   ‘I made a shirt with/out of buckskin.’

   höldà ‘shirt’ is lexically PL

   b.

   \[
   \begin{array}{l}
   \text{AspP} \\
   \quad \text{Asp}^\circ \\
   \quad \text{PFV} \\
   \quad \nuP \\
   \quad \text{DP} \\
   \quad \text{∅} \\
   \quad \text{SPEAKER} \\
   \quad \nu^\circ \\
   \quad \text{VP} \\
   \quad \text{PP} \\
   \quad \text{DP} \\
   \quad \text{P}^\circ \\
   \quad \text{jò} \\
   \quad \langle \text{with} \rangle \\
   \quad \text{DP} \\
   \quad \text{hölða} \\
   \quad \langle \text{a shirt} \rangle \\
   \quad \text{DP} \\
   \quad \text{áum} \\
   \quad \langle \text{make} \rangle \\
   \quad \text{nu} \\
   \quad \text{tháp+kái unified-deer+hide} \\
   \quad \langle \text{buckskin} \rangle \\
   \end{array}
   \]
12 Material in the verbal domain

(14) a. háldà gát= [tháp+káui.+] àumè
    shirt 1SG.3PL=[deer+hide+] make.PFV

    ‘I made a shirt with/out of buckskin.’

(15)
13 The mediating relation

\[ \lambda e \lambda s \lambda w \cdot \exists y \left[ P(y)(w) = 1 \land \text{ROLE}(y)(e)(w) = 1 \right] \langle \langle e; wt \rangle; \langle s; wt \rangle \rangle \]

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
Composition with mediating relations

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

\[(17) \quad \lambda e \lambda w. \exists y[\text{buckskin}(y)(w) \& \text{ROLE}(y)(e)(w)]\]

\[\lambda x \lambda w. \text{buckskin}(x)(w) \quad [M_N]\]

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

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

\[\lambda e_s \lambda w. \exists y[\text{buckskin}(y)(w) \& \text{ROLE}(y)(e)(w)] \quad \lambda x_e \lambda e_s \lambda w. \text{make}(x)(e)(w) = (17)\]

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.

(19) a. qāḥî é= gōp!  
    man 3SGA.1SGO=hit.PFV  
    ‘A man hit me!’

b. *é= qāḥî+ gōp!  
   3SGA.1SGO=man+ hit.PFV

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

(20) Benefactive

a. cóm gáu= āumé  
   friend 1SGA:3INV:3SGD=make.PFV  
   ‘I made it for a friend’

b. *gáu= cóm+ āumé  
   1SGA:3INV:3SGD=friend+ make.PFV

INV: inverse number; here SG
15 Limits on thematic roles

(21) Receptive
   a. cóm  áu=  āu  –jā̀u
      friend 3SGA:3INV:O:3SGD=give.PFV–MOD.VT
      ‘She will give it to a friend.’
   b. *áu=  cóm+  āu  –jā̀u
      3SGA:3INV:O:3SGD=friend+ give.PFV–MOD.VT

(22) Comitatives employ conjunction anyways, let’s set those aside.
   a. qâhî  gàu  á. – chàu  –dè  ē=  chán
      man  and  3P=mother–BAS  3DU=arrive.PFV
      ‘A man came with his mother.’
   b. *qâhî  ē=  châu*  chàn
      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 [\text{AG}], and assigns accusative case [\text{ACC}].
17 Restriction is not due to thematic restriction

But in Kiowa, benefactives and recipients are introduced by Appl° (Harbour 2003, 2008), along with possesors 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. báṑ nèn= fàu+ cânɔnmɔu
      cat 1SGA:3DUO= lead+bring.\textsc{ipfv}
      ‘I am bringing two cats.’

b. báṑ mén= fàu+ cânɔnmɔu
      cat 1SGA:3DUO:2DU\textsc{d} = lead+bring.\textsc{ipfv}
      ‘I am bringing you (2) guys two cats.’
Barrie & Li were on the right track: The way that a head provides thematic information matters. A $P^\circ$ head carries lexical content that assigns a thematic role. The $Z^\circ$ head replaces this content. $v^\circ$ and $\text{Appl}^\circ$ 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)
...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.
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

<table>
<thead>
<tr>
<th>exception</th>
<th>Kiowa</th>
<th>gloss</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>derived lexical item</td>
<td>ī+xō</td>
<td>offspring+put down.sg</td>
<td>‘have a baby’</td>
</tr>
<tr>
<td>embedded in nominal</td>
<td>són₃+tà+qàudàl</td>
<td>grass+cut+vehicle</td>
<td>‘lawn mower’</td>
</tr>
<tr>
<td>control-like</td>
<td>káu₃+àum+chàn</td>
<td>shawl+make+arrive</td>
<td>‘come to make shawls’</td>
</tr>
</tbody>
</table>

Each of these independently requires a mediating relation
That relation can bind the entity argument
A number of expressions involve object incorporation with ‘nameworthy’ phenomena (Mithun 1984)

The verb still shows agreement from the object.

(25) \[ \emptyset = \text{í} + \text{xótjàu} \]
\[ 3\text{SGA.3SGO=offspring} + \text{put down.SG.IPFV} \]

‘She is having a baby.’ (Harrington 1928: 85)

(26) \[ \text{gàt=} \text{é} + \text{zâuimàu} \]
\[ 1\text{SGA.3PO=bread} + \text{mash.IPFV} \]

‘I am kneading the dough.’

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

But their ‘nameworthiness’ suggests that interpretation matters.
A verbal mediating relation

A mediating relation $M_V$ takes the combined N+V and adds the quantifier. $N^o$ can combine with the verb via Restrict or some other form of conjunction.

\[ (27) \quad \llbracket M_V \rrbracket = \lambda e,swt\lambda e\lambda s\lambda w\cdot \exists y\left[ P(y)(e)(w) = 1 \right] \]

\[ \llbracket M_V \left[ \text{dough knead} \right] \rrbracket = \lambda e\lambda s\lambda w\cdot \exists y\left[ \text{dough}(y)(w) & \text{knead}(y)(e)(w) \right] \]

(\text{via Restrict}) : \langle e, \langle s, wt \rangle \rangle

$\lambda y\lambda e\lambda s\lambda w\cdot \text{dough}(y)(w) & \text{knead}(y)(e)(w)$

$\lambda x\lambda e\lambda w\cdot \text{dough}(x)(w) \quad \lambda y\lambda e\lambda s\lambda w\cdot \text{knead}(y)(e)(w)$
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 $P^\circ$, 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)

```
   V_b^\circ
     \  /\    \\
   V_b^\circ M_V V_a^\circ
     /\  \\
   N^\circ V_a^\circ
     /\    \\
  dough knead
```

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
Exception 2: Verbs embedded within nominals

$M_V$ can also be used with a nominalizing head

**overt nominal compounds**

<table>
<thead>
<tr>
<th>Verb Compound</th>
<th>English Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ᵇ+qú+jo</td>
<td>bread+set down.PLc+house</td>
</tr>
<tr>
<td>són+tà+qàudàl</td>
<td>grass+cut+vehicle</td>
</tr>
<tr>
<td>tháp+é+qì</td>
<td>deer+hunt+man</td>
</tr>
</tbody>
</table>

**non-overt nominal compounds**

<table>
<thead>
<tr>
<th>Verb Compound</th>
<th>English Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>chát+tèdà</td>
<td>door+removec</td>
</tr>
<tr>
<td>dàum+sá</td>
<td>groundc+shatter</td>
</tr>
<tr>
<td>hâu+cù</td>
<td>metal+strikec</td>
</tr>
</tbody>
</table>

Note the incorporated forms (c), showing that there is some other head to the expression.
Exception 2: Verbs embedded within nominals

\[ (29) \]

\[ \begin{array}{c}
N_b^o \\
| \downarrow V^o \downarrow N_b^o \\
| \downarrow N_a^o \downarrow V^o \downarrow \emptyset_{\text{nom}} \\
| \text{chát} \quad \langle \text{door} \rangle \quad \text{hédé} \quad \langle \text{remove} \rangle \\
\end{array} \]

\( M_V \) 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 $\varnothing_{\text{nom}}$ adds the modal component.

\[(30)\]  
\[\begin{align*}
   \text{a. } & [\varnothing_{\text{nom}}] = \lambda P_{e,swt} \lambda x e \lambda w w'. \forall w'[\text{Circ}(w)(w') & \land x \text{ is used for its purpose in } w' \rightarrow \exists e' [\text{instrument}(x)(e')(w') \land P(e')(w')]] \\
   \text{READ: In all circumstantial worlds where } x \text{ is used for its purpose, there are events of } P \text{ of which } x \text{ is the instrument.}
   \\
   \text{b. } & \lambda y e \lambda w w'. \forall w'[\text{Circ}(w)(w') & \land y \text{ is used for its purpose in } w' \rightarrow \\
   & \exists e' [\text{instrument}(y)(e')(w') \land \exists x [\text{door}(x)(w') \land \text{open}(x)(e')(w')]]]
\end{align*}\]
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. Mâyóp àn kâu á₃ = àumàu woman.INV HAB shawl 3EMP.A.3SGO=make.IPFV
  ‘The ladies make shawls.’

b. *Mâyóp àn á₃ = kâu+ àumàu woman.INV HAB 3EMP.A.3SGO=shawl+ make.IPFV

INV: inverse number, here plural
EMP: empathetic plural

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

a. Mâyóp àn kâu á₃ = áum+ chànmà woman.INV HAB shawl 3EMPS=make+arrive.IPFV
  ‘The ladies come to make shawls.’

b. Mâyóp àn á₃ = kâu.+ àum+ chànmà woman.INV HAB 3EMPS=shawl+ make+arrive.IPFV
  ‘The ladies come to make shawls.’
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) áuphàu ́á= fò+ bá, né háun gáu= bòmâu
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)

(34) V°
     /\    /\  
    Z°  V°  V°
   /\   /\  
  V°  Z°  bá
 /\ /\  
(bò 〈see〉)

(35) V°
     /\    /\  
    Z°  V°  V°
   /\   /\  
  V°  Z°  bá
 /\ /\  
(chê 〈horse〉)

   /\ /\  
  V°  bò 〈see〉
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
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)
The $v^\circ$ 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?
When transitive object incorporation occurs, the agentive $v^o$ assigns [ACC] case, and the nominal triggers agreement features.

But what does $v^o$ assign case to? The incorporated noun lacks functional material needed for receiving case.

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

(39) $v^o$
    \[\text{VbP} \quad \text{[ACC]} \quad \ldots \quad V_b^o \quad V_a^o \quad M_V \quad N^o \quad (\text{door}) \quad \text{NUM,CL} \quad (\text{remove})\]
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)
Forcing transitive or detransitive object NI

Case assignment and $\phi$-feature transmission are linked to $[D]$ features.
In a language where the categorizing head...

- can bear a $[D]$ feature $\rightarrow$ object NI is transitive
- cannot bear a $[D]$ feature $\rightarrow$ object NI is intransitive

With no $[D]$-bearing head to send case to, $v_{AG}^{\circ}$’s $[ACC]$ would violate the Case Filter.
Only an agentive head with no case assigner is available— the antipassive.
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 \(\varnothing\) = xóide\(\_\) –hèl nègáu \(\acute{a}\)\(\_\) = \(\text{kùi}+\ \text{hā̀fè}\) –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. \(\text{kùi}+\text{hā̀fè}\) \(\lambda\)\(\text{e}\)\(\lambda\)\(\text{s}\)\(\lambda\)\(\text{w}\). drag\(\text{x}\)(\(\text{e}\))(\(\text{w}\)) \& raise\(\text{x}\)(\(\text{e}\))(\(\text{w}\)) \(\langle\text{e}, \langle\text{s, wt}\rangle\)
Verb incorporation

Ability modals and inchoatives seem to take verbal complements

(42)  \( yā = \text{cūn}_{c} + \text{ténxò+dàu} \)
\( 3\text{PLS:1SGD=dance}_{c} + \text{allow+ be} \)
'I am allowed/permited to dance.'

(43)  \( è = \text{sá}l + \text{àumà} \)
\( 3\text{DS}=\text{be hot} + \text{make.DETR.IPVF} \)
'They are catching a fever.'

the detransitive of 'make' = 'become'

Some have more complicated semantics

(44)  \( á − \text{dàu} è = \text{góm} + \text{bôn}_{c} + \text{dàu} \)
\( \text{stick−INV 3INVŠ=wind+ bend+ be} \)
'The stick is bent from the wind.'

(45)  \( á = \text{fǒ} + \text{bá} \)
\( 3\text{EMPS=see}_{c} + \text{go.PFV} \)
'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

\[(46) \quad \text{èm}=\text{qájái.}+\text{fó}+\text{bá}\]
\[2\text{SGS}=\text{chief}+\text{see}_c+\text{go.PFV}\]

‘You went to see the chief.’ \(\approx\) subject control

\[(47) \quad \text{èm}=\text{qǐ}+\text{kâu.}+\text{jòtjàu}\]
\[1\text{SGA.2SGO}=\text{firewood}+\text{get}_c+\text{send.IPV}\]

‘I’m sending you to get firewood.’ \(\approx\) object control
35 Control-like incorporation

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

(48) a. à= chán \[èm= bò -jáu* =dèfèdò \]
LSGS=arrive.PFV LSGA.2GO=see.PFV-MOD.VT=in order to

‘I have come to see you.’

b. à= fô+ chán
LSGS=see c+ arrive.PFV

‘I have come to see you/ him/ them/ her/ it’

(49) a. zèbàut é= áum –hêl
arrow.INV 3GA:3INV=make.PFV–EVID

‘He made an arrow.’

b. zèbàut gà= áum+ máuhól –hêl
arrow.INV 3GA:3PLO=make+ prepare.PFV–EVID

‘He got ready to make an arrow.’

INV number is SG here
máuhól ‘prepare’ has PL obj
The verb’s event, entity, and world arguments need binders
Its agent or subject needs to be linked to a matrix argument
Mediating relation between V and VP ($M_C$)

(50) ám/qā́ˍhî à= fū+ chán
you/man lSGS=see+c+arrive.PFV
‘I have come to see you/ (a/the) man.’

(51)
A ‘control’ mediating relation

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

a. **Associated attitude**
   For any event $e$, let $a_e$ be an attitude associated with $e$, held by the agent or acting participant of $e$.

b. **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**
   $[[M_C]] = \lambda P_{s,wt} \lambda e_s \lambda w_w. \forall w'[ \text{Cont}_w(a_e)(w') \rightarrow \exists e'[ \text{the agent of } e' = \text{the holder of } a_e \& P(e')(w') ]]$
   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. $[[\text{à fóchán}]] = \text{I arrived, and in all worlds where the attitude content associated with that arrival comes true, there’s an event of seeing you whose agent is that attitude’s holder}$
A ‘tough’ mediating relation

(53) á -dàu è= têmₐ+h còt
stick-INV 1INV$=break+ be hard
‘The stick is hard to break.’

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 ] ≃ The stick is such that if someone tried to break it, such an event would be tough to accomplish.
37 A ‘tough’ mediating relation

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**
\[\llbracket \text{côt} \rrbracket = \lambda e \lambda j \lambda s \lambda w. \text{tough}(e)(j)(s)(w)\]
**READ:** *s is a state of e being strong according to j in w.*

(57) **The toughness-mediating relation**
\[\llbracket M_T \rrbracket = \lambda P_{e,swt} \lambda Q_{s,wt} \lambda x \lambda e \lambda s \lambda w. \text{SpSt}(x)(s)(w) \& \]
\[\forall w' \left[ w' \in \text{content}_w(a_s) \rightarrow \forall e[ P(x)(e)(w') \rightarrow Q(e)(\text{holder}(a_s))(w') ] \right] \]
**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.*
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.  \([\textit{believe}] = \lambda p_{wt} \lambda x_{e} \lambda w_{w}. \forall w'[\text{Dox}_x(w)(w') \rightarrow p(w')]\]
   b.  \([\textit{that}] = \lambda p. p\]

(60)  decomposed version (Kratzer)
   a.  \([\textit{believe}] = \lambda x_{e} \lambda s_{s} \lambda w_{w}. \text{believe}(x)(s)(w)\]
   b.  \([\textit{that}_{log}] = \lambda p_{wt} \lambda x. \forall w'[\text{compatible}(x)(w') \rightarrow p(w')]\]
   c.  \([\textit{that}_{fact}] = \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).
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.

\[(61) \quad \text{é} = \text{cûn} \cdot \text{tèndàu} \]
\[3\text{sgS.1sgD=dance}_c + \text{want} \]

‘I want to dance’

If \(\text{⟨want}⟩\) has a simple meaning, then \(M_C\) can be used

\[(62) \quad [\text{tèndàu}] = \lambda s \lambda w\cdot \text{want}(s)(w) \quad \langle s, wt \rangle \]

\[(63) \quad [\text{cûntèndàu}] = \lambda s \lambda w\cdot \text{want}(s)(w) \& \forall w' [\text{Cont}_w(a_s)(w') \rightarrow \exists e' [\text{the agent of } e' = \text{the holder of } a_s \& \text{dance}(e')(w')]] \]

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)
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.
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:

• How much structure is there in a complex predicate?
• 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))
• What happens as we decompose verbs and nouns into bare roots?

* * * Thank you * * *
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