Polysynthesis and the division of labor in grammar
Andrew McKenzie, University of Kansas
Dedication

Yísàum [jíːsɔ̨ːm]
(Parker McKenzie, 1897–1999)

Letter to Harrington, 1945

Parker with author, 1987
Asking the key questions

**Kiowa** /ˈkʰai.əwə/ (kio) Kiowa-Tanoan, CO+KS+OK+TX+NM → OK

(1) [pòj ʔpʰołɑ̃ːhjòp dé=χóː–tɔː=de+педо] ạ=tsán

[again rabbit.INV 1sA:3iO=get.PFV–MOD vt=BAS+for 1sS=arrive.PFV]

‘I came to get some rabbits again.’

BAS: basic nominal number
1/INV: inverse number, here plural
MOD vt: transitive modal
Asking the key questions

Kiowa /ˈkʰɑɪ.əwə/ (kio) Kiowa-Tanoan, CO+KS+OK+TX+NM → OK

(1) [p̪o̞j pʰōląːhjɔ̞p d̪e̞=hóː–tɔː=d̪e̞+p̥e̞ːd̪o̞] à=tsâ̞n
[again rabbit.INV 1sA:3iO=get.PFV–MODVT=BAS+for 1sS=arrive.PFV
‘I came to get some rabbits again.’

(2) à=ɔ̂j+pʰōląːhį̂ː+kʰɔ̞ː+tsàn
1sS=again+rabbit+get_c+arrive.PFV
‘I came to get some rabbits again.’
Asking the key questions

Kiowa /ˈkʰaɪ.owə/ (kio) Kiowa-Tanoan, CO+KS+OK+TX+NM → OK

(1) [pɔj pʰɔɊɊɊ póɊdɛ= hó: -tɔː =dɛ+pɛ:dɔ] ə= tsán
again rabbit.INV 1sA:3iO=get.PFV–MOD$_{VT}$=BAS+for 1sS= arrive.PFV
‘I came to get some rabbits again.’

(2) ə= ɔ̂j+ pʰɔɊɊɊɊ hìː+kʰɔː+tsán
1sS= again+rabbit+ get$_c$+arrive.PFV
‘I came to get some rabbits again.’
Asking the key questions

(1) [pòj ðəlɔːləhp ðə= hó: -tɔː= dè+pèːdò] à= tsàn
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How/Why are these available?
Asking the key questions

(1) [pòj phòlåːhjòp dé= hó: tò–dè-pèːdò] à= tsàn
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‘I came to get some rabbits again.’

(2) à= õj+ phòlåːhì: kʰòː+tsàn
1sS= again+rabbit+ getc+arrive.PFV

‘I came to get some rabbits again.’

How/Why are these available? What happened to these?
The meaning/form gaps are the interesting part
polysynthesis lets speakers say more while building less
The verbal projection handles crucial components of nominal and adverbial meaning
We can build a typology based on these gaps
They aren’t really gaps, but nebular meaning
Every language has bits of polysynthesis
First off...what is a polysynthetic language?

Let’s think less of polysynthetic languages as a definable class...

Humboldt (1827[2013]: 129) the line cannot be clear

Die Zusammenschmelzung in Eins läßt sich auch nur gradweise unterscheiden.

...and think of distinct processes.

Also Schleicher (1858), Sapir (1921), Velten (1935), etc. but see Greenberg (1956) for an attempt to quantify it, and Sadock (2017) against such
Away from personality types

Not to mention, early scholars still tied language ‘personalities’ to national ones.

Duponceau (1819: 252)
the great number of and variety of ideas which it has the power of expressing in one single word…stamp its character for abundance, strength, and comprehensiveness of expression

In the Foreign Review (1826: 488)
that polysynthetic character of American tongue is rather proof of their rudeness and poverty than of their richness and expressiveness.

von Schlegel (1818): ‘affixing languages’ are impoverished and require less intelligence subjectiv sonderbaren und mangelhaften Charakter
Range of polysynthetic processes

So what *are* we looking at?

- argument attachment  "pronominal arguments/agreement"
- functional affixes  "TAM(E) inflection"
- verb/clausal combining  "restructuring"
- thematic stem insertion  "incorporation"
- overt verb decomposition  "templatic morphology"

Fortescue et al. 2017: Mithun, Mattissen, Fortescue
Examples

Mapudungun (Araucanian, Chile) (Zuñiga 2017)

(3) Küpa–l–el–nge–rke–la–i (underlying)
‘They did not bring it to him, they say’

Tariana (Arawakan, Brazil) (Aikhenvald 2017)

(4) di=sape=sina=sita=pita=niki
3SG.NF=speak=REM.P.INFER=PFV=COMPL=REP
‘He had completely finished speaking again’
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‘He had completely finished speaking again’
Narrower look

It’s the narrow polysynthesis that has fascinated people

**Nuuchahnulth** (Wakashan, BC) (Nakayama 2017)

(5) \(\text{tu:k–i·č–san'ap=atl}\) (underlying)

cover.with.sand–covering–on.the.beach.MOMCAUS=EVENT

‘He covered it with sand on the beach.’

**Mohawk** (Iroquoian, NY/ON/QC) (De Caire et al. 2017)

(6) \(\text{onhka wa'–e–honw–a–hninon–}'\) (underlying)


‘Who bought a boat?’

*Fortescue 2017:122 defines p. as requiring two ‘heavy’ morphemes*
Narrower look

It's the narrow polysynthesis that has fascinated people.

Fortescue 2017:122 defines p. as requiring two 'heavy' morphemes.

Nuuchahnulth

(5) tu:ktuːk —iˑč —san'ap —atɬ
cover.with.sand—covering—on.the.beach.MOMCAUS=EVEN'T
‘He covered it with sand on the beach.’

Mohawk

(6) onhka onhka waʽ—e— honw—a— hninon—'
who FAC—F.SG—boat— LK—buy —PUNC
‘Who bought a boat?’
It’s the narrow polysynthesis that has fascinated people. Fortescue 2017:122 defines p. as requiring two ‘heavy’ morphemes.

### Nuuchahnulth

(5) \textit{tuːk} \textit{iˑč} \textit{san’ap} \textit{-atł}

cover.with.sand covering on.the.beach. MOMCAUS EVENT

‘He covered it with sand on the beach.’

### Mohawk

(6) \textit{onhka} \textit{waˑe} \textit{honw–a} \textit{hninon}–


‘Who bought a boat?’
(7) \( \text{étêtè kʼáj–gù} \) \( \text{è=kój+kùn+sɔ̨́m+t'òː–dè:} \) \( \text{gíː–gjà} \)
many Comanche–INV 3iS=Kiowa+dance+{watch}+stay–HSY night–at
‘Many Comanches were present last night to watch Kiowa dancing.’
(Watkins 1984: 210)

(8) \( \text{béthòː} \) \( \text{èm=kùdó+ɔ́ltʰǫ́+kʰòp+ɛ̂m–dè–hèl} \)
{didn't know} 2SS=very+head+hurt+make–DETTR.PFV–HSY
‘(I heard) you have a bad headache.’ (Watkins 1984: –)
Kiowa polysynthesis

(7) éttè kʲáj–gù  è= kój+ kṳ̀n+ sɔ̨̀m+ t’ɔː: –dè: gįː–gʲà
many Comanche–INV 3iS=Kiowa+dance+{watch}+stay –HSY night–at
‘Many Comanches were present last night to watch Kiowa dancing.’
(Watkins 1984: 210)

HSY: hearsay evid.
{...}: abbreviated gloss, not grammatical
DETR: detransitive (here, anticausative)

(8) béthɔː:  èm=kòːdó+ɔltʰǫː+kʰòp+ẽm –dè –hèl
{didn’t know} 2sS=very+ head+hurt+ make–DETR.PFV–HSY
‘(I heard) you got a bad headache.’ (Watkins 1984: –)
Kiowa polysynthesis

(7) éttè kʲâj–gù  è= kólica kų̀n+ sɔ̨̀m+ t'ò: -dè: gį́ː–gʲà
many Comanche–INV 3iS: Kiowa+ dance+{watch}+stay –HSY night–at

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(8) béthɔ̀ː  èm=kò:ðó+ɔltʰʊ–kʰòp–qım  –dè  –hèl
{didn't know} 2SS=very+ head–hurt+ make –DET.PRY–HSY

‘(I heard) you got a bad headache.’ (Watkins 1984: –)
But these are all things happening

What about the things that aren’t?

Let’s look at the gaps, from semantic POV
Gap #1: quantification

Kalaallisut (Eskimo-Aleut, Greenland; van Geenhoven 1998: 99)

(9) Suluut timmisartu+liur–puq.
S.ABS airplane+ make–IND:INTR:3S
‘Suulut made an airplane.’
Gap #1: quantification

Kalaallisut (Eskimo-Aleut, Greenland; van Geenhoven 1998: 99)

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

What quantifies over x in airplane(x)? Property-taking verbs

\[ \lambda \varepsilon \lambda w. \exists x[ \text{airplane}(x)(w) \land \text{make}(x)(e)(w) ] \]

\[ \lambda \chi \lambda w. \text{airplane}(x)(w) \quad \lambda \varepsilon \lambda w. \exists x[ \text{P}(x)(w) \land \text{make}(x)(e)(w) ] \]

Gap #1: quantification

Chung & Ladusaw 2004: quantification elsewhere

(10)

\[ \exists x \ldots \lambda \lambda e \lambda w. \text{airplane}(x)(w) \& \text{make}(x)(e)(w) \]

‘Restrict’ technically does not work when you add possible worlds to events, without adjusting argument order or using situations.
Gap #2: thematic role

McKenzie 2022: mediating relation provides role (and quantifier!)

(11) ka–hseriee’t+aneren–’
    NEUT–cord+tie up–STATIVE
    ‘It is tied up with [some] string.’

(12) tɘ–ralko=waŋerken
    1SG–tent=sew
    ‘I am sewing in the tent.’

(13) ni–k–tle–watsa in nakatl
    I–it–fire–roast the meat
    ‘I roasted the meat with/in fire’
Looking away from objects

Kiowa routinely allows non-object nouns to incorporate

(14)  
   a.  mɔ̨̀ːtsát–tò  à=séːbé.  
       point–with  2sA:3sO=stab_{PFV}.IMPER  
   b.  à=mɔ̨̀ːtsát+sèːbè.  
       2sA:3sO=point+stab_{PFV}.IMPER  
       ‘Stick him with the pointy end.’  

(15)  
   a.  kɔ̨́ːtɔ̀ː+tòː–kù  à=bànmbà  
       commerce+house–to 1sS=go.IPfv  
   b.  à=kɔ̨́ːtɔ̀ː+tòː+bànmbà  
       1sS=commerce+house+go.IPfv  
       ‘I’m going to the store.’
A mediating relation fills the gaps

# cannot conjoin with the right meaning
\[ \lambda x. \text{pointy end}(x) \& \text{stab}(x)(e) \]

\langle \text{stab the pointy end} \rangle

\[ \lambda x. \text{pointy end}(x) \quad \lambda x \lambda e. \text{stab}(x)(e) \]

\langle \text{mɔ̩ːtsát} \rangle \quad \langle \text{séːbé} \rangle

May be \( \delta y \) rather than \( \exists y \)
A mediating relation fills the gaps

\[ \lambda x \lambda e. \text{stab}(x)(e) \& \exists y [ \text{pointy end}(y) \& \text{role}_e(y) ] \]

\langle \text{stab x with a pointy end involved} \rangle

\[ \lambda e. \exists y [ \text{pointy end}(y) \& \text{role}_e(y) ] \]

\langle \text{events with a pointy end involved} \rangle

\[ \lambda x \lambda e. \text{stab}(x)(e) \]

\langle \text{Mediating Relation} \rangle

\[ \lambda x. \text{pointy end}(x) \]

\langle m̃(tsát) \rangle

\[ \lambda e. \exists y [ f(y) \& \text{role}_e(y) ] \]

\langle \text{Mediating Relation} \rangle

May be δy rather than Ψy

\[ \lambda e. \exists y[ \text{pointy end}(y) \& \text{role}_e(y) ] \]

\langle \text{events with a pointy end involved} \rangle

\[ \lambda x \lambda e. \text{stab}(x)(e) \]

\langle \text{Mediating Relation} \rangle
**Gap #3: verb linking**

(16) *Partial list of V+V incorporation types in Kiowa* (McKenzie 2018)

<table>
<thead>
<tr>
<th>Type</th>
<th>Kiowa example</th>
<th>gloss</th>
<th>English translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>manner</td>
<td>kʰúj+bɔ̀ː</td>
<td>drag&lt;sub&gt;c&lt;/sub&gt;+bring</td>
<td>'drag in'</td>
</tr>
<tr>
<td>cause</td>
<td>thɔː+pé:+k'ùjgɔ̀ː</td>
<td>hunger&lt;sub&gt;c&lt;/sub&gt;+dead&lt;sub&gt;c&lt;/sub&gt;+put.DETR</td>
<td>'fall dead from hunger'</td>
</tr>
<tr>
<td>depictive</td>
<td>kʰiŋ+k'ɔ̀ː</td>
<td>cough&lt;sub&gt;c&lt;/sub&gt;+be lying</td>
<td>'lie down coughing'</td>
</tr>
<tr>
<td>aspectual</td>
<td>sál+hɔ̨́n</td>
<td>be hot&lt;sub&gt;c&lt;/sub&gt;+come to end</td>
<td>'cool off'</td>
</tr>
<tr>
<td>degree</td>
<td>sál+cóː</td>
<td>be hot&lt;sub&gt;c&lt;/sub&gt;+be pleasant</td>
<td>'be nice and hot'</td>
</tr>
<tr>
<td>causative</td>
<td>tháp+ɔ̨́ːm</td>
<td>be dry&lt;sub&gt;c&lt;/sub&gt;+make</td>
<td>'dry' (tr)</td>
</tr>
<tr>
<td>inchoative</td>
<td>tháp+ɔ̨́ːm–gʲɔ̀ː</td>
<td>be dry&lt;sub&gt;c&lt;/sub&gt;+make–DTR</td>
<td>'dry out' (intr.)</td>
</tr>
<tr>
<td>comitative</td>
<td>pɔ̀ː+héːbà</td>
<td>bring&lt;sub&gt;c&lt;/sub&gt;+enter</td>
<td>'bring in/take in'</td>
</tr>
<tr>
<td>pretty-constr.</td>
<td>pɔ̀ː+t'áːɡʲɔ̀ː</td>
<td>see&lt;sub&gt;c&lt;/sub&gt;+be good</td>
<td>'be good-looking'</td>
</tr>
<tr>
<td>tough-constr.</td>
<td>thɛm+kòt</td>
<td>break&lt;sub&gt;c&lt;/sub&gt;+be strong</td>
<td>'hard to break'</td>
</tr>
<tr>
<td>result state</td>
<td>thɛm+dɔː</td>
<td>break&lt;sub&gt;c&lt;/sub&gt;+be</td>
<td>'be broken'</td>
</tr>
<tr>
<td>subject control</td>
<td>thɛm+ɔ̨́ndɔː</td>
<td>break&lt;sub&gt;c&lt;/sub&gt;+want</td>
<td>'want to break' (tr.)</td>
</tr>
<tr>
<td>object control</td>
<td>thɛm+dɔːpèː</td>
<td>break&lt;sub&gt;c&lt;/sub&gt;+ask.PFV</td>
<td>'ask to break'</td>
</tr>
</tbody>
</table>
Need for a mediating relation

(17) áː–dɔ̀ è=tʰɛ̃m+kɔt
stick–INV 3SciS=break+be strong
‘The stick is hard to break’

Tough-construction known to have operators/structure

\[
\text{tough}(w) \\
M_R(w)(w') \quad \text{break}(w')
\]

Chomsky 1977, Hicks 2009, Gluckman 2021
Gap #4: control

A connection has to link the highest embedded argument with an argument of the main clause.

\[ \text{udder.inv 1sS=)get_c+want} \]

‘I want to get the udder!’

Classic accounts use PRO, or more complex systems

Subject control relation:

\[
\begin{align*}
[M_c] &= \lambda P \lambda e \lambda w. \ \forall w' \left[ w' \in \text{content}_w(a_e) \rightarrow \exists e'[ \text{agent(holder}(a_e))(e')(w') \& P(e')(w') ] \right]
\end{align*}
\]
Gap #5: number

The number of an argument is routinely expressed in the verb

Caddo (Caddoan: Melnar 2008: 110)

(20) ʔicuda–wa–hak–iʔn–ah  (underlying)
in a pile–PL–stand–CAUS–PFV
‘They piled it’

(21)  \[
\begin{array}{c}
[PL] = \lambda y\lambda e. \text{NON-ATOMIC}(y)(e)
\end{array}
\]
Gap #5: number

The number of an argument is routinely expressed in the verb

\[ \lambda y \lambda e. \text{non-atomic}(y)(e) \]

\[ \lambda e. \exists e [ \text{cause}(e')(e) \& \text{stand}(it)(e') ] \]

\[ \lambda s. \text{stand}(it)(s) \& \text{pile}(it)(s) \]

\[ \lambda e. \exists e [ \text{cause}(e')(e) = 1 \& f(e') = 1 ] \]

\[ \lambda x \lambda s. \text{pile}(x)(s) \]

\[ \lambda x \lambda s. \text{stand}(x)(s) \]

\[ \langle \text{inapile} \rangle \]

\[ \langle \text{stand} \rangle \]
Gap #1 also involves a mediating relation

Adger et al. 2009

(20)  *à=pʰòlą́ːhį̀ː+hɔ̀ː–già

IsS=rabbit+get–PFV

‘I got some rabbits.’
Back to Gap #1

Gap #1 also involves a mediating relation
Kiowa does not allow object incorporation

(20) \( *a=p^h\text{olq}:\text{hi}:+\text{ho}:-\text{ga} \)
\( 1sS=\text{rabbit}+\text{get}–\text{PFV} \)
‘I got some rabbits.’

...unless some other mediating relation is already there.

(21) \( a=p^h\text{olq}:\text{hi}:+k^h\text{h}:+\text{tsa}n \)  (under incorporated verb)
\( 1sS=\text{rabbit}+\text{get}_c+\text{arrive.PFV} \)
‘I came to get some rabbits.’

(22) \( p^h\text{olq}:\text{hi}:+k^h\text{h}:+k'i: \)  (under categorizing head)
\( \text{rabbit}+\text{get}_c+\text{male.AGENTIVE} \)
‘rabbit-getter’

Adger et al. 2009
Quantifying over objects

Languages like Kalaallisut or Mohawk have this relation above the verb; languages like Kiowa do not.

**Mohawk** (De Caire et al. 2017)

(23) onhka wa'–e–honw–a–hminon–' (underlying)

‘Who bought a boat?’

Thus: the elements of polysynthesis depend on which heads are present
Listing the major gaps

Each gap has a distinct semantic meaning

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Formalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>quantifying</td>
<td>$\exists x \ldots x$</td>
</tr>
<tr>
<td>classificatory</td>
<td>\textsc{class}(x)</td>
</tr>
<tr>
<td>number</td>
<td>\textsc{number}(x)</td>
</tr>
<tr>
<td>control</td>
<td>$\lambda x \ldots x$</td>
</tr>
<tr>
<td>purpose, etc</td>
<td>\textsc{link}(e')(e)</td>
</tr>
<tr>
<td>thematic role</td>
<td>\textsc{role}(x)(e)</td>
</tr>
<tr>
<td>transitivity</td>
<td>\textsc{agent}(x)(e)</td>
</tr>
<tr>
<td>causation</td>
<td>\textsc{cause}(e')(e)</td>
</tr>
<tr>
<td>depictive</td>
<td>\textsc{state}(x)(e)</td>
</tr>
</tbody>
</table>

...and more besides

a typology of gaps, rather than forms

are they gaps, really?

what are these ‘gaps’ doing the work of?
Dividing the labor

Determiners convert nominal properties into entities or quantifiers
In polysynthesis, the verbal projections do this
Dividing the labor

Adpositions, case-assigning heads, and low verbal heads convert nominals into event modifiers (via thematic roles) in polysynthesis, the extended verbal projections do this.

Some can’t be replaced: \texttt{AGT, DAT}

\textbf{Barrie \& Li, McKenzie}
Dividing the labor

Complementizers and tense-heads convert sentences into properties
In polysynthesis, the verbal projections do this.

The verbs likewise lack inflectional forms from higher projections

Wurmbrand 20...
Replacing functional heads

Each of these gaps essentially does the work of functional head(s).

<table>
<thead>
<tr>
<th>phenomenon</th>
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<th>functional head</th>
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<tbody>
<tr>
<td>quantifying</td>
<td>$\exists x \ldots x$</td>
<td>$D^\circ$</td>
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<td>$\text{CLASS}(x)$</td>
<td>$\text{Cl}^\circ$</td>
</tr>
<tr>
<td>number</td>
<td>$\text{NUMBER}(x)$</td>
<td>$\text{Num}^\circ$</td>
</tr>
<tr>
<td>control</td>
<td>$\lambda x \ldots x$</td>
<td>$T^\circ$</td>
</tr>
<tr>
<td>purpose, etc</td>
<td>$\text{LINK}(e')(e)$</td>
<td>$C^\circ$</td>
</tr>
<tr>
<td>thematic role</td>
<td>$\text{ROLE}(x)(e)$</td>
<td>$P^\circ$</td>
</tr>
<tr>
<td>transitivity</td>
<td>$\text{AGENT}(x)(e)$</td>
<td>$\text{Voi}^\circ$</td>
</tr>
<tr>
<td>causation</td>
<td>$\text{CAUSE}(e')(e)$</td>
<td>$\nu^\circ$</td>
</tr>
<tr>
<td>depictive</td>
<td>$\text{STATE}(x)(e)$</td>
<td>$\text{Pred}^\circ$</td>
</tr>
</tbody>
</table>

... and more besides

the gaps correspond to particular functional heads
Polysynthesis handles the syntax, too

Mediating heads can bear \([v]\), and thus case

Variation in transitivity/valence/agreement with object incorporation

**Southern Tiwa** (Kiowa-Tanoan: New Mexico, Allen et al 1984: 296)

(24) \(a^- \text{diru} + k^\text{'ar}-\text{hi}\)

2sA:3sO–chicken+eat–FUTURE

‘You will eat the chicken.’

**Kalaallisut** (van Geenhoven 1998: 99)

(25) Suluut \text{timmisartu}+liur–puq.

S.ABS airplane+ make–IND:INTR:3S

‘Suulut made an airplane.’
mediating heads can bear $[\Delta]$... 

(24) $a$– $\text{diru}+$ $k'ar$–$\text{hi}$

$2$sA:$3$sO–$\text{chicken}$+$\text{eat}$–FUTURE

‘You will eat the chicken.’

The mediating head bears $[\Delta]$ feature
mediating heads can bear \([d]\)…

\[(24)\] \(a– \text{diru}+ \text{k'ar–hi} \)

\(2sA:3sO–\text{chicken}+\text{eat–FUTURE}\)

‘You will eat the chicken.’

The mediating head bears \([d]\) feature

\(\nu^\circ\) can assign case to what bears the nearest \([d]\) feature
mediating heads can bear \([D]\)…

\[(24)\] a– diru+ k'ar–hi

2sA:3sO– chicken+eat–FUTURE

‘You will eat the chicken.’

The mediating head bears \([D]\) feature

\(\nu^0\) can assign case to what bears the nearest \([D]\) feature
... or they can’t

(25) \textbf{Suluut timmisartu-liur–puq.}

\begin{align*}
\text{S.ABS} & \quad \text{airplane+} & \quad \text{make–IND:INTR:3S} \\
\text{‘Suulut made an airplane.’}
\end{align*}

The mediating head does not bear \([d]\)

Given that lack, \(v^\circ\) has nothing to assign case to: *

\(v^\circ\) can't assign \([\text{acc}]\), so cannot be agentive \(\to\) antipassive
… or they can’t

S.ABS airplane+ make–IND:INTR:3S

‘Suuulut made an airplane.’

The mediating head does not bear [d]

Given that lack, $v^\circ$ has nothing to assign case to: *

\[
\begin{array}{c}
\text{v}^\circ \\
\text{V}_{bP} \\
\text{[ACC]} \\
\text{…} \\
\text{V}^\circ_b \\
\text{M}_V \\
\text{N}^\circ \\
\langle \text{make} \rangle \\
\text{[NUM]} \\
\end{array}
\]
... or they can't

(25) Suluut timmisartu-liur-puq.

S.ABS airplane+ make–IND:INTR:3s

'Suulut made an airplane.'

The mediating head does not bear [d]

Given that lack, $v^\circ$ has nothing to assign case to: *

$v^\circ$ can't assign [ACC], so cannot be agentive $\rightarrow$ antipassive
The value of polysynthesis

- Polysynthesis allows for greater vagueness → easier to build

  \[
  \text{?j+ pʰɔlɑːhɪ+kʰɔ+tsàn} \\
  \text{1s= again+rabbit+ get_c+arrive.PFV} \\
  \text{‘I came to get a rabbit / (some) rabbits again.’}
  \]

- Distinct heads allow for greater precision → easier to interpret

  \[
  [\text{pɔj pʰɔlɑːhjɔp dɛ= hɔ: -tɔ: =dɛ+pɛ:dɔ]} \text{ à= tsàn} \\
  [\text{again rabbit.INV 1sA:3iO=get.PFV-MOD_{vt}=BAS+for 1sS= arrive.PFV} \\
  \text{‘I came to get some rabbits again.’}
  \]

- What does the vagueness mean for us?
von Schlegel (1818) ‘affixes’ express secondary ideas and relations, while having their own complete meaning

ils servent à exprimer les idées accessoires et les rapports, en s’attachant à d’autres mots, mais que, pris isolément, ils renferment encore un sens complet

Duponceau’s (1819, 1833: 89) original formulation: They bring together a large number of ideas in the form of a single word.

Le caractère général des langues américaines consiste en ce qu’elles réunissent un grand nombre d’idées sous la forme d’un seul mot

Lieber (1857: 60): holophrasis is an assemblage of ideas

the impulse…to express the whole proposition in one word…instigated by the stronger stimulus which the imagination receives from an idea conveyed in one word rather than in many.

Sapir (1911: 257): The grammatical process of a logical relation…is sacrificed to a compositional process in which the logical relation is only implied.
Polysynthesis of the gaps

Bally (1965): synthesis $\leftrightarrow$ omission

primitive nebula

Un procédé linguistique est d’autant plus synthétique qu’il se rapproche de la nébuleuse primitive, c’est-à-dire de la pensée non communiquée

des aren’t gaps, they’re nebula}s
More benefits of polysynthesis

Neublar meaning reflects tight-knit speech communities

It is still flexible, which helps processing and creativity
Processing shows evidence of this help in compounds

Corpora show that regularized patterns help out
Computers still have a very hard time with it

Trudgill 2011, 2017
Bréal 1896
Gibbon 1999, Fiorentino & Popper 2007, Marelli et al 2017
Macguire et al. 2010
Lexicalization

- Many incorporated forms are lexicalized
- Lexicalizing heads host mediating relations

**English** (Germanic, UK & former colonies)

(26) *story-teller, hot dog-eating*, etc.

(27) *We [duck hunt]_v^-ed yesterday, She [world-build]_v^-s better than Gaiman*

- Lexicalization mitigates nebulization

**Innu** (Algonquian, QC/NF; Drapeau 2017: 567)

(28) *nit-acu:− kut−a:w*

1− decrease–with crooked knife,TA–1>3DP

‘I trim down an animate with a crooked knife’
Lexicalization does not rule out flexibility

we store one relation, but others can win
Lexicalization does not rule out flexibility

we store one relation, but others can win

duck pond?
Lexicalization does not rule out flexibility
Lexicalization does not rule out flexibility
Likewise with Kiowa incorporation

Similar hesitant flexibility can be elicited

(29)  hóldà giàt\=[t'áp+kʰɔ̀j]+ɔ̨ːm–ę̀ː
   shirt  1sA:3pO=[deer+skin]+make–PFV
   ‘I made a shirt out of buckskin’

(30)  ‘I made a shirt inside a buckskin.’
   Speaker comment: “I guess you could say that.”
Why have non-polysynthesis 1: precision

The distinct heads allow for greater precision → easier to interpret

(31) \( \text{inv is provided by } D^\circ \)

a. \([\dot{o}:z\dot{a}j]_\text{DP} \quad [\text{VP } \dot{a}=k^h\dot{q}:+t'\dot{o}: ] \)
   \text{udder.INV} \quad 1sS=get_c+want
   ‘I want to get an/the udder!’

b. \([\text{VP } \dot{a}=[\dot{o}:z\dot{a}:]_\text{NP}+k^h\dot{q}:+t'\dot{o}: ] \)
   \text{IsS=udder}+get_c+want
   ‘I want to get an (#the) udder / some udders!’
Why have non-polysynthesis 2: Ensuring referentiality

Using non-verbal functional heads allows speakers to guarantee some referentiality.

Allows for wide scope or discourse-tied resource situations

Definiteness: uniqueness in a particular resource situation

\[ [\text{the cat } s_i] = \nu x [\text{cat}(x)(s_i)] \text{ the unique cat in } s_i \]

Heim 1990, Elbourne 2005, Schwarz 2009
Why have non-polysynthesis 2: Ensuring referentiality

Indefinite *de re/specificity: Situation tied to the discourse*

These can be moved past aspect

Moving past aspect: signal that must be tied to the discourse

(33)  

non-specific:
   a. $\exists e[ \exists x[ \text{cat}(x)(e) \& \text{purr}(x)(e) ]$
   b. $\#\exists x[ \text{cat}(x)(e) \& \exists e[ \text{purr}(x)(e) ]$

specific:
   a. $\exists e[ \exists x[ \text{cat}(x)(s_i) \& \text{purr}(x)(e) ]$
   b. $\exists x[ \text{cat}(x)(s_i) \& \exists e[ \text{purr}(x)(e) ]$

McKenzie 2015
High and low interpretations

Polysynthesis packs the ‘low’ together, where a lot can remain unsaid

- thetic/categorical
- semantic partition
- topic/comment

polysynthesis is (mostly) down here

Sasse 1987, Ladusaw 1994
Diesing 1992
Jaeger 2001
Might also help understand a lacuna

- Cross-linguistically: Incorporated nouns never = ∀x

- ∀x always requires an overt A- or D-quantifier

- Universal Quant: presupposes a non-empty domain [no vacuous quant.]

- Domain is also presupposed: they’re always too ‘referential’

(34) Every cat (in si) has a tail presupposes there are cats in si

footnote: Some thematic stems do seem to indicate all the parts of the theme, or the event
Features of polysynthesis?

- These features have fascinated scholars for centuries
- Looking at the semantic nebulae helps us see what is going on
Features of polysynthesis?

- These features have fascinated scholars for centuries
- Looking at the semantic nebulas helps us see what is going on
- Verbal heads do work that other projecting heads do elsewhere
- Say more while building less
- Why these languages and not others?
Features of polysynthesis?

- These features have fascinated scholars for centuries
- Looking at the semantic nebulas helps us see what is going on
- Verbal heads do work that other projecting heads do elsewhere
- Say more while building less
- Why these languages and not others?
- Well, before we say “not others” ...
- These features do abound, just not in a single word
Saturating indefinites at a distance

Polysynthesis uses the verb to saturate indefinites

Heim 1982: Existential closure — indefinites are quantified in the sentence

Kratzer & Shimoyama 1998: Indeterminates closed at a distance

Various: High quantification over choice functions

all of these are in the extended verbal projection
Some phenomenological correlates

- Verb combining
  - Light verbs
  - Serial verbs
  - Restructuring
- Overt verb decomposition
  - Phrasal verbs
  - Verbal prefixes
  - Compound verbs
  - Causative/voice marking
- Thematic stems
  - Pseudo-incorporation
Linear templatic systems abound

Polysynthesis puts arguments in the verb; they can be dropped

**French** (Romance, France + neighbors & former colonies)

(35) je=le=lui=ai donné hier

'I gave it to him yesterday'
Linear templatic systems abound
Polysynthesis puts arguments in the verb; they can be dropped

**French** (Romance, France + neighbors & former colonies)

(35) \(je=le=lui=ai\) \(\text{donné}\) \(\text{hier}\)
I=it=to him=have.PRES.1S give.PTCP yesterday
‘I gave it to him yesterday’

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VERB
Ordering of adverbs

(36) sàðò á= óbòj+kìhit+ tsà:dè:
child:INV 3PLS=truly+single file+{stroll along}
‘The children really were walking calmly in a line’

* sàðò á= kìhit+ òbòj+tsà:dè:
child:INV 3PLS=single file+truly+{stroll along}
Ordering of adverbs

- **evaluative**
  - óbój ‘truly’
  - háj {wondering}

- **modal**
  - hén {thinking}
  - kón PERMISSIVE

- **temporal**
  - ó: ‘awhile’
  - kʰó: ‘right away’

- **agent-manner**
  - sém ‘secretly’
  - kőét ‘in fear’

- **degree**
  - kôːdó ‘much’
  - ójgó ‘barely’

- **theme-manner**
  - kį́hít ‘single-file’
    - áldà {layered}
    - dáʔk’à ‘bobbing’

- **bound actions**
  - dó: ‘sing’
  - k’jó: ‘love’

- **VERB**
Ordering of adverbs

Adverbs are specifiers of functional heads

\[
\begin{array}{l}
[\text{frankly \text{Mood}_{speech\ act}} \ [\text{fortunately \text{Mood}_{evaluative}} \ [\text{allegedly} \\
\text{Mood}_{evidential} \ [\text{probably \text{Mod}_{epistemic}} \ [\text{once \text{T(Past)}} \ [\text{then \text{T(Future)}} \\
[\text{perhaps \text{Mood}_{irrealis}} \ [\text{necessarily \text{Mod}_{necessity}} \ [\text{possibly \text{Mod}_{possibility}} \\
[\text{usually \text{Asp}_{habitual}} \ [\text{again \text{Asp}_{repetitive(I)}} \ [\text{often \text{Asp}_{frequentative(I)}} \\
[\text{intentionally \text{Mod}_{volitional}} \ [\text{quickly \text{Asp}_{celerative(I)}} \ [\text{already \text{T(Anterior)}} \\
[\text{no longer \text{Asp}_{terminative}} \ [\text{still \text{Asp}_{continuative}} \ [\text{always \text{Asp}_{perfect(?)}} \ [\text{just} \\
\text{Asp}_{retrospective} \ [\text{soon \text{Asp}_{proximative}} \ [\text{briefly \text{Asp}_{durative}} \\
[\text{characteristically(?) \text{Asp}_{generic/progressive}} \ [\text{almost \text{Asp}_{prospective}} \\
[\text{completely \text{Asp}_{SgComplete(I)}} \ [\text{tutto \text{Asp}_{PlComplete}} \ [\text{well \text{Voice}} \\
[\text{fast/early \text{Asp}_{celerative(II)}} \ [\text{again \text{Asp}_{repetative(II)}} \ [\text{often \text{Asp}_{frequentative(II)}} \\
[\text{completely \text{Asp}_{SgComplete(II)}} \ (\text{Cinque 1999: 106)}
\end{array}
\]
Polysynthetic processes become clear with a semantic approach
Verbal projections do the work of externally projecting ones
Many of them involve nebular meaning
Figuring out nebulas leads to new classification
Figuring out nebulas helps as a learner
...but how do you teach a nebula?
Acknowledgments
Thanks to the Kiowa elders who have shared their knowledge with me, in person, in recordings, and in archived documents.
Shout-out to the RiFFL seminar crowd at KU for feedback on earlier version

Portions of this work were supported by NSF grant #BCS-1006571