Aspect as eventuality centering: English & Polish

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Abstract
Bittner (2012, Ch. 4) proposes the following centering universals about *grammatical tense* (TNS), *grammatical aspect* (ASP), *grammatical mood* (MOOD), and *grammatical person* (PRN), jointly referred to as *TAMP*.

Figure 1 Centering TAMP-universals
(*T*) TNS fills, or pushes down, the verb's time argument with a dref anchored to a top-ranked time and/or event ($\top\tau$, $\bot\tau$, $\top\varepsilon$, $\bot\varepsilon$).
(*A*) ASP fills, or pushes down, the verb's eventuality argument with a dref anchored to a top-ranked state and/or event ($\top\sigma$, $\bot\sigma$, $\top\varepsilon$, $\bot\varepsilon$).
(*M*) MOOD fills, or pushes down, the verb's world argument with a dref anchored to a top-ranked world and/or event ($\top\omega$, $\bot\omega$, $\top\varepsilon$, $\bot\varepsilon$).
(*P*) PRN fills the verb's subject or object argument with a dref anchored to a top-ranked individual and/or event ($\top\delta$, $\bot\delta$, $\top\varepsilon$, $\bot\varepsilon$).

For any *TAMP*-category *X*, a language is classified as *X-prominent* iff it has argument-filling *X*-markers or *X*-features. These always form a grammatical paradigm, because λ-bound arguments must be saturated and can only be saturated once. In Ch. 2–3, evidence was presented that Mandarin, Kalaallisut, and Polish are all *P-prominent* (subject and/or object arguments are filled by PRN features in Mandarin, $_{\top}(\cdot)$, $_{\bot}(\cdot)$, $(\cdot)_{\top}$, $(\cdot)_{\bot}$, PRN inflections in Kalaallisut and Polish, -3SG$_{\top}$, -3SG$_{\bot}$, …), whereas English is not. Moreover, Polish and English are *T-prominent* (reference time arguments filled by TNS inflections or auxiliaries, -PRS$_{\top\varepsilon}$, -PST$_{\top\varepsilon,\,\bot\varepsilon}$, …), whereas Mandarin and Kalaallisut are not. Chapter 4 extends the story to grammatical aspect. Today, we present evidence that Polish is *A-prominent* (eventuality arg's filled by ASP features \I$_{\bot\varepsilon}$, \P$_{\bot\varepsilon}$), whereas English is not. Next time, we argue that Mandarin too is *A*-prominent (arg-filling ASP-features E/, E^1/, S/, S^1/).

Outline
1. Background: Algebra of things and eventualities
2. *TNS*-based temporality in English
3. Centering *TAMP*-universals
4. Aspectual pairing in Polish
5. *TA*-based temporality in Polish
6. Conclusions and conjectures

1 BACKGROUND: ALGEBRA OF THINGS & EVENTUALITIES

Figure 2. Bach 1986 *event algebra*: $\langle \mathcal{D}_{\varepsilon^+} \cup \mathcal{D}_{\varepsilon^-}, \sqsubseteq, {}^{\triangledown}, {}^{\blacktriangle}, \ldots\rangle$

INPUT	OPERATION	OUTPUT	GRAPHIC
event e			●●●
event e	${}^{\triangledown}e = f$	ground e = process f	------
event e	${}^{\blacktriangle}e = e'$	packaged e = atomic event e'	●●●

(1) a. *Al* ***is***^{s} *working*^{e}. $s \sqsubseteq {}^{\triangledown}e$
b. *Al put* ***some***^{y} *apple*^{x} *in the salad.* $y \sqsubseteq {}^{\triangledown}x$

(2) a. *Al did* ***a bit***$^{e'}$ *of* {*work*^{e} | **leaving*^{e}}. $e' = {}^{\blacktriangle}e$
b. *Al ate* ***a portion***$^{x'}$ *of* {*nuts*^{x} | **a nut*^{x}} $x' = {}^{\blacktriangle}x$

Figure 3. Moens & Steedman 1988 *aspectual algebra*: $\langle \mathcal{D}_{\varepsilon} \cup \mathcal{D}_{\pi} \cup \mathcal{D}_{\sigma}, {}^{\triangleright}, {}^{\blacktriangleleft}, \ldots\rangle$

INPUT	OPERATION	OUTPUT	GRAPHIC
point e			●
point e	${}^{\triangleright}e = s$	consequent state s	———
point e	${}^{\blacktriangleleft}e = f$	preparatory process f	---------

(3) i. *Al went* (PST^{t1} *go*^{e1}) *into a florist shop.* *Narration* (i–ii)
ii. *He bought* (*PST*$_{e1}{}^{t2}$ buy^{e2}) *a bunch of roses.* $\vartheta e_2 \subseteq t_2 \subseteq \vartheta^{\triangleright} e_1$

(4) i. *Al went* (PST^{t1} *go*^{e1}) *into a florist shop.* *Explanation* (i–ii)
ii. *He promised* (*PST*$_{e1}{}^{t2}$ promise^{e2}) *Beth to buy some roses.* $\vartheta e_2 \subseteq t_2 \subseteq \vartheta^{\blacktriangleleft} e_1$

Figure 4. Bittner 2012 *aspectual algebra*: $\langle \mathcal{D}_{\varepsilon} \cup \mathcal{D}_{\sigma}, \sqsubseteq, {}^{\triangleright}, {}^{\blacktriangleleft}, {}^{\triangledown}, {}^{\blacktriangle}, {}^{\blacktriangleright}, {}^{\blacktriangleleft}, \ldots\rangle$
[Terminology: *point* = 1-atom event, *process* = 2^+-atom event (causal chain)]

INPUT	OPERATION	OUTPUT	GRAPHIC
point e			●
point e	${}^{\triangleright}e = s$	consequent state s	———
point e	${}^{\blacktriangleleft}e = e'$	preparatory process e'	●●●●
process e'	${}^{\triangledown}e' = s'$	state-equivalent s'	———
process e'	${}^{\blacktriangle}e' = e''$	point-equivalent e''	●●●●
state s'	${}^{\blacktriangleright}s' = e'''$	start-point e'''	●
state s'	${}^{\blacktriangleleft}s' = e$	culmination-point e	●

(5) i. *Al played chess* (PST *play.chess*^{e1}) *yesterday.*
ii. *He won* (PST *win*$_{e1}{}^{e2}$). $e_2 = {}^{\blacktriangleleft\triangledown} e_1$

(6) *Al began to sing* (PST *begin*^{e2} INF *sing*^{e1}). $e_2 = {}^{\blacktriangleright\triangledown} e_1$

2 *TNS*-BASED TEMPORALITY IN ENGLISH

ABBREVIATIONS: *c-* = culminating/culmination, prog = progress, con = consequent

(7)	*aspectual type & anaphoric* TNS_e [M&S]	*asp-type a*	v^a *rel.*	TNS_e *rel.*
	When^t *Al came* (PST$_t$ *come*^{e}) *to Paris he…*			
a.	*wrote* ($PST_e{}^{t'}$ write$^{e'}$) *a book.*	*c*-process e'	$\vartheta e' \sqsubseteq t'$	$t' \sqsubseteq \vartheta^{\triangleright} e$
b.	*finished* ($PST_e{}^{t'}$ finish$^{e'}$) *writing*$^{e''}$ *his bk.*	*c*-point e'	$\vartheta e' \sqsubseteq t'$	$t' \sqsubseteq \vartheta^{\triangleright} e$
c.	*had* ($PST_e{}^{t'}$ have^s) *a book in press.*	state s	$\vartheta s = t'$	$\vartheta e \sqsubseteq t'$
d.	*was* ($PST_e{}^{t'}$ be^s) *writing*$^{e'}$ *a book.*	prog-state s	$\vartheta s = t'$	$\vartheta e \sqsubseteq t'$
e.	*was* ($PST_e{}^{t'}$ be^s) *dying*$^{e'}$.	prog-state s	$\vartheta s = t'$	$\vartheta e \sqsubseteq t'$
f.	*was going* ($PST_e{}^{t'}$ be.going^s) *to wrt*$^{e'}$ *a bk.*	pre-state s	$\vartheta s = t'$	$\vartheta e \sqsubseteq t'$
g.	*had* ($PST_e{}^{t'}$ have^s) *just written*$^{e'}$ *a book.*	con-state s	$\vartheta s = t'$	$\vartheta e \sqsubseteq t'$

(8)	*asp-type,* ASP *& anaphoric* TNS_e [Smith]	*asp-type a*	$ASP\ v^a$	TNS_e
	When^t *Al came* (PST$_t$ *come*^{e}) *to Paris he …*			
a.	*wrote* ($PST_e{}^{t'}$ Ø write$^{e'}$) *a book.*	*c*-process e'	$\vartheta e' \sqsubseteq t'$	$t' = \vartheta^{\triangleright} e$
b.	*finished* ($PST_e{}^{t'}$ Ø finish$^{e'}$) *writing*$^{e''}$ *his bk.*	*c*-point e'	$\vartheta e' \sqsubseteq t'$	$t' = \vartheta^{\triangleright} e$
c.	*had* ($PST_e{}^{t'}$ Ø have^s) *a book in press.*	state s	$\vartheta s \bigcirc t'$	$t' = \vartheta e$
d.	*was* ($PST_e{}^{t'}$ PRG) *writing*$^{e'}$ *a book.*	*c*-process e'	$\vartheta e' \bigcirc t'$	$t' = \vartheta e$
e.	*was* ($PST_e{}^{t'}$ PRG) *dying*$^{e'}$.	*c*-point e'	$t' < \vartheta e'$	$t' = \vartheta e$
f.	*was going to* ($PST_e{}^{t'}$ PRE) *write*$^{e'}$ *a bk.*	*c*-process e'	$t' < \vartheta e'$	$t' = \vartheta e$
g.	*had* ($PST_e{}^{t'}$ PRF) *just written*$^{e'}$ *a book.*	*c*-process e'	$\vartheta e' < t'$	$t' = \vartheta e$

(9)	*asp-type & anaphoric* TNS_e *(&* ASP_e*)* [Bitt]	*asp-typ a*	$(ASP_e{}^s)\ v^a$	TNS_e
	When^t *Al came* (PST$_t$ *come*^{e}) *to Paris he…*			
a.	*wrote* ($PST_e{}^{t'}$ write$^{e'}$) *a book.*	*c*-proc. e'	$\vartheta e' \sqsubseteq t'$	$t' \sqsubseteq \vartheta^{\triangleright} e$
b.	*finished* ($PST_e{}^{t'}$ finish$^{e'}$) *writing*$^{e''}$ *his bk.*	$e' = {}^{\blacktriangle\triangledown}e''$	$\vartheta e' \sqsubseteq t'$	$t' \sqsubseteq \vartheta^{\triangleright} e$
b′.	*began* ($PST_e{}^{t'}$ begin$^{e'}$) *to write*$^{e''}$ *a book.*	$e' = {}^{\blacktriangleright\triangledown}e''$	$\vartheta e' \sqsubseteq t'$	$t' \sqsubseteq \vartheta^{\triangleright} e$
c.	*had* ($PST_e{}^{t'}$ have^s) *a book in press.*	state s	$t' \sqsubseteq \vartheta s$	$t' \sqsubseteq \vartheta e$
c′.	*was* ($PST_e{}^{t'}$ be^s) *busy*.	state s	$t' \sqsubseteq \vartheta s$	$t' \sqsubseteq \vartheta^{\triangleright} e$
d.	*was* ($PST_e{}^{t'}\ PRG_e{}^s$) *writing*$^{e'}$ *a book*.	$s \sqsubseteq {}^{\triangledown}e'$	$\vartheta e \sqsubseteq t' \sqsubseteq \vartheta s$	$t' \sqsubseteq \vartheta e$
d′.	?*was* ($PST_e{}^{t'}\ PRG_e{}^s$) *visiting*$^{e'}$ *Louvre.*	$s \sqsubseteq {}^{\triangledown}e'$	$\vartheta e \sqsubseteq t' \sqsubseteq \vartheta s$	$t' \sqsubseteq \vartheta e$
e.	*was* ($PST_e{}^{t'}\ PRG_e{}^s$) *dying*$^{e'}$.	$s \sqsubseteq {}^{\triangledown\blacktriangleleft}e'$	$\vartheta e \sqsubseteq t' \sqsubseteq \vartheta s$	$t' \sqsubseteq \vartheta e$
f.	*was going to* ($PST_e{}^{t'}\ PRE_e{}^s$) *write*$^{e'}$ *a bk.*	${}^{\blacktriangleleft}s = {}^{\blacktriangle}e'$	$\vartheta e \sqsubseteq t' \sqsubseteq \vartheta s$	$t' \sqsubseteq \vartheta e$
g.	*had* ($PST_e{}^{t'}\ PRF_e{}^s$) *just written*$^{e'}$ *a book.*	$s = {}^{\triangleright}e'$	$\vartheta e \sqsubseteq t' \sqsubseteq \vartheta s$	$t' \sqsubseteq \vartheta e$

3 CENTERING *TAMP*-UNIVERSALS

Figure 1. Centering TAMP-universals [Bittner 2012]

(*T*) TNS fills, or pushes down, the verb's time argument with a dref anchored to a top-ranked time and/or event ($\top\tau$, $\bot\tau$, $\top\varepsilon$, $\bot\varepsilon$).

(*A*) ASP fills, or pushes down, the verb's eventuality argument with a dref anchored to a top-ranked state and/or event ($\top\sigma$, $\bot\sigma$, $\top\varepsilon$, $\bot\varepsilon$).

(*M*) MOOD fills, or pushes down, the verb's world argument with a dref anchored to a top-ranked world and/or event ($\top\omega$, $\bot\omega$, $\top\varepsilon$, $\bot\varepsilon$).

(*P*) PRN fills the verb's subject or object argument with a dref anchored to a top-ranked individual and/or event ($\top\delta$, $\bot\delta$, $\top\varepsilon$, $\bot\varepsilon$).

- For any language *L* and *TAMP*-category *X*, *L* is *X-prominent*, iff *L* has argument-filling *X*-markers or *X*-features

- ENGLISH (*T*-prominent)

  a. Verbs have an argument slot for a *reference time*, filled by *TNS*-marker (e.g. inflection *-ed* 'PST' or *-Ø* 'PRS', auxiliary *will* 'FUT', particle *to* ~ *Ø* 'INF')

  b. English *TNS*-markers are *obligatory* & form a *grammatical paradigm* (i.e. set of forms such that one and only is required by the grammar, on pain of *)

  c. *Eventuality* of Eng. verb is NOT a λ-bound arg. at any point in the derivation. Instead, [*e*|…] or [*s*|…] is introduced by *event*-verbs (v^e) and *state*-verbs (v^s), respectively.

  d. English *ASP*-markers instantiate *push-down* ASP—i.e. introduce an eventuality of their own (e.g. con-state of $PRF_e{}^s$, prog-state of $PRG_e{}^s$) on top of evt. *a* of v^a.

  e. English *ASP*-markers are gramm. *optional* & do *not* form a gramm. paradigm (e.g. PRF and PRG can co-occur: *he has been running* (PRS PRF^s $PRG^{s'}$ run^e))

  f. English verbs have λ-bound args. for *subjects* and *objects*, but these are filled *syntactically* (obligatory argument NP's), *not* by PRN-markers or PRN-features

- POLISH (*TAP*-prominent)

  a. Verbs have λ-bound arguments for an *eventuality, reference time*, and *subject*, filled, in order, by *ASP*-feature (perfective \P or imperfective \I), *TNS*-marker (PST or PRS inflection, FUT inflection or auxiliary) & *PRN*-inflection (e.g. -3SF)

  b. Polish *ASP*-features, *TNS*-markers, and *PRN*-inflections are all *obligatory* & for each category, the members form a *grammatical paradigm*.

4 ASPECTUAL PAIRING IN POLISH

Figure 5 Push-down ASP test for Polish ASP-features

	v-*DUR* (*jąc*)	v-*PRF* (*wszy*)
\P	*	✓
\I	✓	*

(10) a. *Zasnął-em* {*ogląda-**jąc*** | *obejrza-**wszy***} *dziennik*.
fall.asleep\P-PST.1SM {watch\I-*DUR* | watch\P-*PRF*} news.ACC
I fell asleep {watching | having seen} the news.

b. *Zasypia-ł-em* {*ogląda-**jąc*** | *obejrza-**wszy***} *dziennik*.
fall.asleep\I-PST.1SM {watch\I-*DUR* | watch\P-*PRF*} news.ACC
I was falling asleep {watching | having seen} the news.

• Młynarczyk 2004: Ch. 4 Aspectual pairmates of Polish verb-bases based on *secondary (im)perfectivization* tests

class	\I (unmarked)		\P (unmarked)	\P▲ (do a bit)	\P$^{!}$ (semelfct)
class$_1$	*istnieć* ‘exist’	→	***za**istnieć*	*	*
	jechać ‘go$_{riding}$’	→	***po**jechać*	*	*
	tyć ‘gain weight’	→	***u**tyć*	*	*
class$_2$	*spać* ‘sleep’	→	*	***po**spać*	*
	stać ‘stand’	→	*	***po**stać*	
	pracować ‘work’	→	*	***po**pracować*	*
	jeździć ‘ride’	→	*	***po**jeździć*	*
class$_3$	*pisać* ‘write’	→	***na**pisać*	***po**pisać*	*
	śpiewać ‘sing’	→	***za**śpiewać*	***po**śpiewać*	*
	oglądać ‘watch’	→	***obejrze**ć*	***po**oglądać*	*
class$_4$	*pukać* ‘knock’	→	***za**pukać*	***po**pukać*	*puk**nąć***
	krzyczeć ‘shout’	→	***za**krzyczeć*	***po**krzyczeć*	*krzyk**nąć***
	gwizdać ‘whistle’	→	***za**gwizdać*	***po**gwizdać*	*gwizd**nąć***
class$_5$	*zas**ypia**ć*	←	*zasnąć* ‘fall asleep’	*	*
	*sta**wa**ć*	←	*stanąć* ‘stand up’	*	*
	*przyje**żdża**ć*	←	*przyjechać* ‘come$_{riding}$’	*	*
	*przepis**ywa**ć*	←	*przepisać* ‘copy$_{writing}$’	*	*
	*zakrzyk**iwa**ć*	←	*zakrzyczeć* ‘shout dwn’	*	*

• Młynarczyk 2004: Ch. 5 Induced semantic classes

class	\I (unmarked)		\P (unmarked)	\P▲ (do a bit)	\P$^{!}$ (semelfct)
class$_1$	*ongoing*		*completed*		
	state or	→	state onset	*	*
	gradual transition	→	gradual transition	*	*
class$_2$	*ongoing* process	→	*	*compl*. proc.	*
class$_3$	*ongoing c*-process	→	*completed* *c*-process	*completed* non-culminating *c*-process	*
class$_4$	*ongoing* unitizable process (*u*-process)	→	*completed* arbitrary *u*-process	*completed* non-min. *u*-process	*completed* minimal *u*-process
class$_5$	*ongoing* culmination	←	*completed* culmination	*	*

• Bittner 2012: Ch. 4 Induced semantic classes
– v\I or v\P introduce a *state* or a *point* (atomic event), respectively
– relation btw base & derived eventualities involves op’s in $\{^{\triangleright}, {}^{\blacktriangleleft}, {}^{\triangledown}, {}^{\blacktriangle}, {}^{\blacktriangleright}, {}^{\blacktriangleleft}\}$

class	\I (unmarked)		\P (unmarked)	\P▲ (do a bit)	\P$^{!}$ (semelfct)
v^{s}	s	→	e' s.t. $^{\triangleright}e' = s$	*	*
	$s = {}^{\triangledown}e$	→	e' s.t. $^{\triangleright}e' = {}^{\triangledown}e$		
	$s = {}^{\triangledown}e$	→	e' s.t. $^{\triangledown\blacktriangleleft}e' \sqcup {}^{\triangleright}e' = {}^{\triangledown}e$	*	*
v$^{e\bullet\bullet}$	$s = {}^{\triangledown}e$	→	*	$e'' = {}^{\blacktriangle}e$	*
v$^{e\bullet}$	$s = {}^{\triangledown}e$	→	$e' = {}^{\blacktriangle}(e \sqcup {}^{\blacktriangleleft\triangledown}e)$	$e'' = {}^{\blacktriangle}e$	*
v^{e}	$s = {}^{\triangledown}e$	→	$e' = {}^{\blacktriangle}(e \sqcup {}^{\blacktriangleleft\triangledown}e)$	$e'' = {}^{\blacktriangle}e$	e s.t. $\mathbf{1}^{\mathcal{A}}e$
	$s = {}^{\triangledown}e$	→	$e' = {}^{\blacktriangleright\triangledown}$	$e'' = {}^{\blacktriangle}e$	e s.t. $\mathbf{1}^{\mathcal{A}}e$
v$^{\bullet e}$	$s = {}^{\triangledown\blacktriangleleft}e$	←	e s.t. … $^{\blacktriangleleft}e$ …	*	*
	$s = {}^{\triangledown\blacktriangleleft}e$	←	e s.t. $\exists e'$: … $e = {}^{\blacktriangle}({}^{\blacktriangleleft}e' \sqcup e')$	*	*

5 *TA*-BASED TEMPORALITY IN POLISH

(11) *Gdy Jan przyjecha-ł do Paryża …*
when Jan\M come$_{riding}^{\bullet e}$\P-PST.3SM to Paris
When Jan came in Paris …

a. {*lubi-ł* | ***po****lubi-ł*} *to miasto.*
{like^{s}*I-PST*.3SM | like^{s}*P-PST*.3SM} this city.ACC
he {was fond | became fond} of the city.

b. {*pracowa-ł* | ***po****pracowa-ł*} *nad książką.*
{work^{e}*I-PST*.3SM | work^{e}*P-PST*.3SM} over book.INS
he {was working | did some work} on his book.

c. {*pisa-ł* | ***na****pisa-ł* | ***właśnie na****pisa-ł*} *książkę.*
{write$^{e\bullet}$*I-PST*.3SM | write$^{e\bullet}$*P-PST*.3SM | *just* write$^{e\bullet}$*P-PST*.3SM} book.ACC
he {was writing | wrote | had just written} a book.

d. {*kończy-ł* | ***s****kończy-ł*} *pisa-ć książkę.*
{finish$^{\bullet e}$*I-PST*.3SM| finish$^{\bullet e}$*P-PST*.3SM} write$^{e\bullet}$\I-INF book.ACC
he {was finishing | finished} writing a book.

Model for (11) Topic-setting *when*-clause with *I*-comment
——————➤ real time

Dref.		*Symbol: Description*	*Temporal condition*	*Source*
	●	$^{\intercal}e_0$: e_0-speaker speaks up		e_0
■■■■■		t_1: e_0-past	$t_1 <_\tau \vartheta e_0$	PST
●		e_1: Jan comes to Paris	$\vartheta e_1 \subseteq t_1$, $\vartheta e_0 \subseteq \vartheta^{\triangleright} e_1$	\P
■		$^{\intercal}\mathbf{t'_1}$: ***topical part of*** $\mathbf{t_1}$	$\mathbf{t'_1} \subseteq t_1$	when...\P
──		s_2:	$\vartheta e_1 \subseteq \mathbf{t'_1} \subseteq \vartheta s_2$	\I
a.		s_2: Jan likes Paris		v^{s}\I
b.		s_2: Jan is working on a book	$\exists e_2$: $s_2 \sqsubseteq_\sigma {}^{\triangledown} e_2$ & ...	v^{e}\I
c.		s_2: Jan is writing a book	$\exists e_2$: $s_2 \sqsubseteq_\sigma {}^{\triangledown\blacktriangleleft} e_2$ & ...	$v^{e\bullet}$\I
d.		s_2: Jan is finishing writing a bk.	$\exists e_2$: $e_2 = {}^{\blacktriangle}({}^{\blacktriangleleft\blacktriangleleft} s_2 \sqcup_\varepsilon {}^{\blacktriangleleft} s_2)$ & ...	$v^{\bullet e}$\I

Model for (11) Topic-setting *when*-clause with \P-comment

Dref.		*Symbol: Description*	*Temporal condition*	*Source*
	●	$^{\intercal}e_0$: e_0-speaker speaks up		e_0
■■■■■		t_1: e_0-past	$t_1 <_\tau \vartheta e_0$	PST
●		e_1: Jan comes to Paris	$\vartheta e_1 \subseteq t_1$, $\vartheta e_0 \subseteq \vartheta^{\triangleright} e_1$	\P
■		$^{\intercal}\mathbf{t'_1}$: ***topical part of*** $\mathbf{t_1}$	$\mathbf{t'_1} \subseteq t_1$	when...\P
●		e_2:	$\vartheta e_2 \subseteq \mathbf{t'_1} \subseteq \vartheta^{\triangleright} e_1$	\P
a.		e_2: Jan begins to like Paris	$\exists s_2$: ${}^{\triangleright} e_2 = s_2$ & ...	v^{s}\P
b.		e_2: Jan does sm work on a book	$\exists e'_2$: $e_2 = {}^{\blacktriangle} e'_2$ & ...	v^{e}\P
c.		e_2: Jan writes a book	$\exists e'_2$: $e_2 = {}^{\blacktriangle}({}^{\blacktriangleleft} e'_2 \sqcup_\varepsilon e'_2)$ & ...	$v^{e\bullet}$\P
d.		e_2: Jan finishes writing a book		$v^{\bullet e}$\P
c′.	●	e_1: Jan comes to Paris	$\vartheta e_1 \subseteq t_1$, $\vartheta e_0 \subseteq \vartheta^{\triangleright} e_{-1}$	\P
	■	$^{\intercal}\mathbf{t'_1}$: ***topical part of*** $\mathbf{t_1}$	$\mathbf{t'_1} \subseteq t_1$	when...\P
	■	t_2: just before e_1-time $^{\intercal}\mathbf{t'_1}$	$t_2 <_{brief} \mathbf{t'_1} = \vartheta e_1$	just
	●	e_2: Jan writes a book	$\vartheta e_2 \subseteq t_2$, $\vartheta e_1 \subseteq \vartheta^{\triangleright} e_2$	\P
			$\exists e'_2$: $e_2 = {}^{\blacktriangle}({}^{\blacktriangleleft} e'_2 \sqcup_\varepsilon e'_2)$ & ...	$v^{e\bullet}$\P

6 CONCLUSIONS AND CONJECTURES

- Based on English (*T*-prominent), Polish (*TAP*-prominent), Mandarin Chinese (*AP*-prominent), and Kalaallisut (*MP*-prominent), Bittner (2012) conjectures that every language has at least one prominent *TAMP*-feature, most languages have more than one, and no *TAMP*-feature is universally prominent.
- In an *X-prominent language*, verbs have a λ-bound argument of type $a \in f(X)$, where $f(T) = \{\tau\}$ (times), $f(A) = \{\varepsilon, \sigma\}$ (events, states), $f(M) = \{\omega\}$ (worlds), and $f(P) = \{\delta\}$ (individuals). This argument is filled by a member of a grammatical paradigm of *X*-features or *X*-markers (i.e. TNS, ASP, MOOD, or PRN) interpreted as discourse reference to a type *a*-entity with a top-level anchor (i.e. linked to one or more top-ranked antecedents in $\{\top a, \bot a, \top\varepsilon, \bot\varepsilon\}$).