Temporal anaphora in English revisited

1. BASIC PARADIGM AND THREE PUZZLES

• ***Basic paradigm***:

$e_1 \subseteq s_2$, $e_1 < e_3$, RS $e_3 \subseteq s_4$	||	$^{\top}t_0$
(A1) Today Mary *met* a friend in a bookstore.	•|||	e_1, $^{\top}t_1 = \vartheta_{w0}\ \mathrm{RS}_{w0}\ e_1$
(A2) The lady *was* with her brother…	==	s_2
(A3) …and she *introduced* him to Mary.	•|||	e_3, $^{\top}t_3 = \vartheta_{w0}\ \mathrm{RS}_{w0}\ e_3$
(A4) Mary *liked* him a lot.	==	s_3

$n \subseteq$ RS e_1, $n \subseteq s_2$, $n \subseteq {}^1ee_3$, $n \subseteq$ RS ${}^1\mathscr{E}\mathscr{E}_4$	|	$^{\top}t_0 = \vartheta_{w0}\,{}^{\top}e_0$ (now)
(B1) John *has* come home (an hour ago).	•====	$\mathrm{RS}_{w0}\ e_1$
(B2) He'*s* in the library with his wife.	===	s_1
(B3) She'*s* read*ing*…	•===	$\mathrm{RS}_{w0}\ {}^1ee_3$
(B4) …and he'*s* writ*ing* a letter.	•==	$\mathrm{RS}_{w0}\ [{}^1\mathscr{E}\mathscr{E}_4]w_0$

• **Puzzle 1: *Complex events***

~ Kamp & Rohrer 1983:260
(C1) Last year Jean *climbed* Mt. Cervin.
(C2) The first day he *climbed* up to the hut at H.
(C3) He *stayed* there overnight.
(C4) Next he *attacked* the north face.
(C5) Twelve hours later he *reached* the summit.

• **Puzzle 2: *New topic time ≠ result time***

~ Webber 1988:70
(D1) Mary *climbed* Mt. McKinley.
(D2) *The preparations* took her longer than the ascent.

~ Kamp & Rohrer 1983:261
(E1) It was an *eventful summer*.
(E2) François *married* Adèle, …
(E3) …Jean *left* for Brasil,
(E4) …and Paul *bought* a house.

• **Puzzle 3: *Subordinate time lines***

~ Webber 1988:69
(F1) John **went** into the florist shop.
(F2) He *had* promis*ed* Mary some flowers.
(F3) She *said…*
(F4) …she <u>*would*</u> be upset
(F5) …if he <u>*forgot*</u>.
(F6) So he **picked** out ten beautiful roses.

2. TENSE, MOOD, AND ASPECT IN ENGLISH

<u>Form</u>	<u>*MB* gloss (stands for)</u>	<u>1st ex</u>	<u>Presupposition (^{P}); update</u>		
Speech-relative ('absolute') **tense system:**					
• **d**ε-past (<u>tense</u> infl, add <u>mood</u> in modal contexts, e.g. (F3), (F5))					
-ed, …	-PST (past)	(A1)	$^P[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]$;	$[\mid d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$;	$[\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ d\varepsilon]$
		(C1)	$^P[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]$;	$[\mid {}^1d\varepsilon\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$;	$[\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ {}^1d\varepsilon\varepsilon]$
		(A2)	$^P[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]$;	$[\mid \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma]$	
	(*say*…)	(F3)	$^P[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]$;	$[\mid d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$;	$[\mathscr{T}\mid \mathscr{T} = (\vartheta\mathrm{RS}\ d\varepsilon\mid d\Omega)]$
	(*if*…)	(F5)	$^P[\mid \mathbf{d}\omega\tau < \vartheta_{\mathbf{d}\omega}\mathbf{d}\varepsilon]$;	$[\mid d\backepsilon \subseteq \mathbf{d}\omega\tau]$;	$[\mathscr{T}\mid \mathscr{T} = \vartheta\mathrm{RS}\ d\backepsilon]$;
• **d**ε-present (<u>tense</u> infl)					
-s, …	-PRS (present)	(B1)	$^P[\mid \mathbf{d}\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$;	$[\mid \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma]$	
• **d**ε-future (<u>tense</u> + <u>mood</u> aux)					
will	FUT (future)		$^P[\mid \mathbf{d}\varepsilon < \mathbf{d}\omega\tau]$;	$[\mathscr{E}\mid \mathscr{E} \subseteq \mathbf{d}\omega\tau]$;	$[\mathscr{T}\mid \mathscr{T} = \vartheta\mathrm{RS}\ d\backepsilon]$;
Event-relative ('relative') **tense system:**					
• *d*ε-past (<u>aspect</u> aux–<u>tense</u> infl vrb–<u>aspect</u> infl)					
ha-	EE (*d*ε-past)	(F2)		$[ee\mid prc\ ee,\ {}^f ee = d\varepsilon]$;	$[\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta^1 d\varepsilon\varepsilon]$
-d	-PST (past)	(C1)	$^P[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]$;	$[\mid {}^1d\varepsilon\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$;	$[\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ {}^1d\varepsilon\varepsilon]$
-en, …	*-pprf* (past perfect)	(F2)		$[\mid d\varepsilon = {}^1d\varepsilon\varepsilon]$	
• *d*∍-present (<u>tense</u> + <u>mood</u> aux)					
(w)ere	E.PRS (*d*∍-present)	(H1)	$^P[\mid \mathbf{d}\omega\tau \subseteq d\backepsilon]$;	$[\mathscr{S}\mid \mathbf{d}\omega\tau \subseteq \mathscr{S}]$;	
• *d*ε-future (<u>tense</u> + <u>mood</u> aux)					
would	E.FUT (*d*ε-future)	(F4)	$^P[\mid d\varepsilon < \mathbf{d}\omega\tau]$;	$[\mathscr{E}\mid \mathscr{E} \subseteq \mathbf{d}\omega\tau]$;	$[\mathscr{T}\mid \mathscr{T} = \vartheta\mathrm{RS}\ d\backepsilon]$;
Aspect system, e.g.:					
• perfective & progressive (<u>aspect</u> aux–<u>tense</u> infl vrb-<u>aspect</u> infl)					
have	HAVE (prf-state)	(B1)		$[s\mid \mathrm{DA}\ s =_{\mathbf{d}\omega} \mathbf{d}\alpha]$	
-en, …	*-prf* (perfective)	(B1)		$[\mid d\sigma =_{\mathbf{d}\omega} \mathrm{RS}\ d\varepsilon]$	
be	BE (prg-state)	(B3)		$[s\mid \mathrm{DA}\ s =_{\mathbf{d}\omega} \mathbf{d}\alpha]$	
-ing	*-prg* (progressive)	(B3)		$[\mid d\sigma =_{\mathbf{d}\omega} \mathrm{RS}\ {}^1d\varepsilon\varepsilon]$	(activity)
		(B4)		$[\mid d\sigma =_{\mathbf{d}\omega} \mathrm{RS}\ {}^1d\backepsilon\backepsilon]$	(accomp.)

<u>Remarks</u>:

- According to this story, *perfective* (**aspect**) ≠ *past perfect* (**tense**):

(G1) *Perfective* (**aspect**): **d**τ-current *result state*
I *have lost* my watch (* yesterday). #But I *have found* it again.

(G2) *Past perfect* (**tense**): *d*ε*-past*
John came back from his trip full of excitement.
He *had lost* his watch (✓ yesterday), but *had found* it again.…

- *Were* = BE + E.PRS, e.g., ***counterfactual*** *were* in *if I were you*, or ***hypothetical*** *were* in (H1):

(H1) John decid*ed* (PST) a week ago
…that in ten days at breakfast he *would (*E.FUT) say to his mother
…that they *were* (= BE + E.PRS) hav*ing* their last meal together. (Hans Kamp)

3. BASIC PARADIGM ONLINE

- $\boldsymbol{e_1 \subseteq s_2, e_1 < e_3,}$ **RS** $\boldsymbol{e_3 \subseteq s_4}$

(A1) Today Mary *met* a friend in a bookstore. •||| e_1, $^{\top}t_1 = \vartheta_{w0}\ \mathrm{RS}_{w0}\ e_1$
(A2) The lady *was* with her brother… == s_2
(A3) …and she *introduced* him to Mary. •||| e_3, $^{\top}t_3 = \vartheta_{w0}\ \mathrm{RS}_{w0}\ e_3$
(A4) Mary *liked* him a lot. == s_3

(A1) Today *if*
$[\mathbf{t}|\ \mathbf{t} \subseteq_{\mathbf{d}\omega} day.of\{\mathbf{d}\varepsilon\}]$;

Mary (*ib*) *ib*
$^{\mathrm{P}}[|\ \mathbf{d}\alpha \neq mary]$; $[\mathbf{a}|\ \mathbf{a} = mary]$;

meet- *mf*
$[e\ a|\ e{:}\ \mathbf{d}\alpha\ meet_{\mathbf{d}\omega}\ a]$;

-PST
$^{\mathrm{P}}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]$; $[|\ d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$; $[\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ d\varepsilon]$;

a friend *fb*
$[k^{\alpha}|\ d\alpha =_{\mathbf{d}\omega} k^{\alpha}\{d\varepsilon\}]$;$[|\ d\kappa^{\alpha}\ friend.of\ \mathbf{d}\alpha]$;

in a bookstore. *ff*
$[b|\ d\varepsilon \subseteq_{\mathbf{d}\omega} in\{b\}]$; $[k^{\beta}|\ d\beta =_{\mathbf{d}\omega} k^{\beta}\{d\varepsilon\}]$; $[|\ bookstore\ d\kappa^{\beta}]$

(A2) The lady (*ib*) *ib*
$^{\mathrm{P}}[|\ \mathbf{d}\alpha \neq d\alpha]$; $[|\ lady\ d\alpha]$; $[\mathbf{a}|\ \mathbf{a} = d\alpha]$;

be- *mf*
$[s|\ \mathrm{DA}\ s =_{\mathbf{d}\omega} \mathbf{d}\alpha]$;

-PST
$^{\mathrm{P}}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]$; $[|\ \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma]$;

with her brother… *fb*
$[k^{\alpha}|\ k^{\alpha}\{d\sigma\} \neq_{\mathbf{d}\omega} \mathrm{DA}\ d\sigma]$; $^{\mathrm{P}}[|\ 3sf\ \mathbf{d}\alpha]$; $[a_{\alpha}|\ k^{\alpha}\{d\sigma\} =_{\mathbf{d}\omega} a_{\alpha}\{\mathbf{d}\alpha\}]$; $[|\ d\alpha\alpha(\alpha)\ bro.of\ \alpha]$

(A3) …and *if*
$^{P}[| \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma]; [e| e \neq_{\mathbf{d}\omega} \text{BG}\ s];$

she *ib*
$^{P}[| \mathit{3sf}\ \mathbf{d}\alpha];$

introduce- *mf*
$[a| d\varepsilon{:}\ \mathbf{d}\alpha\ \mathit{introduce}_{\mathbf{d}\omega}\ a\ \mathit{to}\ \text{DA}];$

-PST
$^{P}[| \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [| d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}| \mathbf{t} =_{\mathbf{d}\omega} \vartheta\text{RS}\ d\varepsilon];$

him *fb*
$^{P}[| \mathbf{d}\alpha \neq d\alpha\alpha(\mathbf{d}\alpha), \mathit{3sm}\ d\alpha\alpha(\mathbf{d}\alpha)]; [| d\alpha = d\alpha\alpha(\mathbf{d}\alpha)]$

to Mary.
$[k^{\alpha}| k^{\alpha}\{\cdot\} =_{\mathbf{d}\omega} \text{DA}\{\cdot\}];\ ^{P}[| \mathbf{d}\alpha \neq \mathit{mary}, d\alpha \neq \mathit{mary}]; [| d\kappa^{\alpha}\{d\varepsilon\} =_{\mathbf{d}\omega} \mathit{mary}]$

(A4) Mary (*ib*) *ib*
$^{P}[| \mathbf{d}\alpha \neq \mathit{mary}]; [\mathbf{a}| \mathbf{a} = \mathit{mary}]$

like- *mf*
$[s\ h^{\sigma}| (h^{\sigma}{:}\ \mathbf{d}\alpha\ \mathit{like}\ \text{DA}), (s \in_{\mathbf{d}\omega} \text{Ran}\ h^{\sigma}), (\text{DA}\ s =_{\mathbf{d}\omega} d\alpha)];$

-PST
$^{P}[| \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [| \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma];$

him *fb*
$^{P}[| \mathbf{d}\alpha \neq d\alpha, \mathit{3sm}\ d\alpha];$

a lot.[1] *ff*
$[hh^{\sigma}| \mathit{scale}(hh^{\sigma}, \text{Ran}\ d\eta^{\sigma}, \mathit{how.much}),\ d\sigma \in_{\mathbf{d}\omega} \text{Ran}\ ^{f}hh^{\sigma}]$

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[1] See Bittner *in press* 'Word order and incremental update', *Proceedings of CLS* 39 (2003), for the theory of scalar comparison assumed here. The basic idea is that an *adverbial scale* is a chain of ranked habits, e.g., in (A4):
$hh^{\sigma} = \langle$**d**α likes DA at least d_1-much, **d**α-likes DA at least d_2-much, …$\rangle$
while an *adjectival scale* is a chain of ranked kinds, e.g.,
$kk^{\alpha} = \langle$at least d_1-tall, at least d_2-tall, at least d_3-tall, …$\rangle$

• $\boldsymbol{n \subseteq \mathrm{RS}\ e_1, n \subseteq s_2, n \subseteq {}^1ee_3, n \subseteq \mathrm{RS}\ {}^1\mathscr{E}\mathscr{E}_4}$ | $^{\top}t_0 = \vartheta_{w0}{}^{\top}e_0$ (now)

(B1) John *has* come home (an hour ago). •==== $\mathrm{RS}_{w0}\ e_1$
(B2) He'*s* in the library with his wife. === s_1
(B3) She'*s* read*ing*… •=== $\mathrm{RS}_{w0}\ {}^1ee_3$
(B4) …and he'*s* writ*ing* a letter. •== $\mathrm{RS}_{w0}\ [{}^1\mathscr{E}\mathscr{E}_4]w_0$

(B1) John *ib*
$^{P}[|\ \mathbf{d}\alpha \neq john]$; $[\mathbf{a}|\ \mathbf{a} = john]$;

HAVE *mf*
$[s|\ \mathrm{DA}\ s =_{\mathbf{d}\omega} \mathbf{d}\alpha]$;

-PRS
$^{P}[|\ \mathbf{d}\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$; $[|\ \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma]$;

come-
$[e\ k^{\pi}|\ e\!: \mathbf{d}\alpha\ come.to_{\mathbf{d}\omega}\ k^{\pi}]$;

-prf
$[|\ d\sigma =_{\mathbf{d}\omega} \mathrm{RS}\ d\varepsilon]$;

home *fb*
$[|\ d\kappa^{\pi}\ home.of\ \mathrm{AG}]$

an hour ago. *ff*
$[t|\ one.hour(t)]$; $[|\ \#d\tau = \#(d\varepsilon, \mathbf{d}\varepsilon)]$

(B2) He *ib*
$^{P}[|\ 3sm\ \mathbf{d}\alpha]$;

be- *mf*
$[s|\ \mathrm{DA}\ s =_{\mathbf{d}\omega} \mathbf{d}\alpha]$;

-PRS
$^{P}[|\ \mathbf{d}\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]$; $[|\ \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma]$;

in the library. *ff*
$[b|\ d\sigma \subseteq_{\mathbf{d}\omega} in\{b\}]$; $^{P}[|\ in\{d\beta\} \subseteq_{\mathbf{d}\omega} d\kappa^{\pi}\{d\varepsilon\}]$; $[|\ library\ d\beta]$

with his wife
$[k^{\alpha}|\ k^{\alpha}\{d\sigma\} \neq_{\mathbf{d}\omega} \mathrm{DA}\ d\sigma]$; $^{P}[|\ 3sm\ \mathbf{d}\alpha]$; $[a_{\alpha}|\ k^{\alpha}\{d\sigma\} =_{\mathbf{d}\omega} a_{\alpha}\{\mathbf{d}\alpha\}]$; $[|\ d\alpha\alpha(\alpha)\ wife.of\ \alpha]$

(B3) She *ib*
$^{P}[\mid \mathit{3sf}\ d\alpha\alpha(\mathbf{d}\alpha)];\ [\mathbf{a}\mid \mathbf{a} = d\alpha\alpha(\mathbf{d}\alpha)];$

BE- *mf*
$[s\mid \text{DA}\ s =_{\mathbf{d}\omega} \mathbf{d}\alpha];$

-PRS
$^{P}[\mid \mathbf{d}\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau];\ [\mid \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma];$

read-
$[\mathit{ee}\ k^{\beta}\mid \mathit{ee}\colon \mathbf{d}\alpha\ \mathit{read}_{\mathbf{d}\omega}\ k^{\beta}];$

-prg
$[\mid d\sigma =_{\mathbf{d}\omega} \text{RS}\ {}^{1}d\varepsilon\varepsilon];$

(B4) …and *if*
$^{P}[\mid \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma];\ [s\mid s \neq d\sigma];$

he *ib*
$^{P}[\mid \mathit{3sm}\ \mathbf{d}\alpha_1];\ [\mathbf{a}\mid \mathbf{a} = \mathbf{d}\alpha_1];$

BE- *mf*
$[\mid \text{DA}\ d\sigma =_{\mathbf{d}\omega} \mathbf{d}\alpha];$

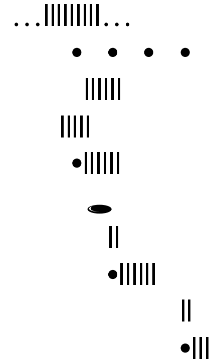
-PRS
$^{P}[\mid \mathbf{d}\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau];\ [\mid \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma];$

write-
$[\mathscr{E}\mathscr{E}\ k^{\beta}\mid \mathscr{E}\mathscr{E}\colon \mathbf{d}\alpha\ \mathit{write}\ k^{\beta}];$

-prg
$[\mid d\sigma =_{\mathbf{d}\omega} \text{RS}\ {}^{1}d\ni\ni];$

a letter *fb*
$[\mathscr{B}\mid \mathscr{B} = d\kappa^{\beta}\{{}^{f}d\ni\ni\}];\ [\mid \mathit{letter}\ d\kappa^{\beta}];$

3. PUZZLE 1: COMPLEX EVENTS AS PROCESSES



(C1) Last year Jean climbed Mt. Cervin.

(C2) The first day…
…he climbed up to the hut at H.
(C3) He stayed there overnight.
(C4) Next…
…he attacked the north face.
(C5) Twelve hours later…
…he reached the summit.

(C1) Last year — *if*
$[\mathbf{t}\ k^{\tau}|\ \mathbf{t} \subseteq_{\mathbf{d}\omega} \mathit{last.before}\{k^{\tau}, k^{\tau}\{\mathbf{d}\varepsilon\}\}]; [|\ \mathit{year}\ d\kappa^{\tau}];$

Jean — *ib*
${}^{P}[|\ \mathbf{d}\alpha \neq \mathit{jean}]; [\mathbf{a}|\ \mathbf{a} = \mathit{jean}];$

climb- — *mf*
$[ee\ k^{\pi}|\ ee: \mathbf{d}\alpha\ \mathit{climb.up.to}_{\mathbf{d}\omega}\ k^{\pi}];$

-PST
${}^{P}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [|\ {}^{1}d\varepsilon\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ {}^{1}d\varepsilon\varepsilon];$

Mt. Cervin. — *fb*
$[b|\ b = \mathit{mt.cervin}]; [|\ d\kappa^{\pi}\{{}^{f}d\varepsilon\varepsilon\} =_{\mathbf{d}\omega} \mathit{summit.of}\{d\beta\}];$

(C2) The first day — *if*
$[\mathbf{t}|\ \mathbf{t} \subseteq_{\mathbf{d}\omega} \mathit{1st.day.of}\{d\varepsilon\varepsilon\}];$

he — *ib*
${}^{P}[|\ \mathit{3sm}\ \mathbf{d}\alpha];$

climb- — *mf*
${}^{P}[|\ d\varepsilon\varepsilon: \mathbf{d}\alpha\ \mathit{climb.up.to}_{\mathbf{d}\omega}\ d\kappa^{\pi}\{\varepsilon\}]; [e|\ e \in d\varepsilon\varepsilon];$

-PST
${}^{P}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [|\ d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ d\varepsilon];$

up — *fb*
${}^{P}[|\ d\kappa^{\pi}\{d\varepsilon\}\ \mathit{above}_{\mathbf{d}\omega}\ d\kappa^{\pi}\{{}^{1}d\varepsilon\varepsilon\}];$

to the hut at H. — *ff*
$[l|\ d\kappa^{\pi}\{d\varepsilon\} =_{\mathbf{d}\omega} l]; [|\ \mathit{hut.at.H.}\{d\pi\}]$

(C3) He *ib*
^{P}[| *3sm* **d**α];

stay- *mf*
[*e*| AG *e* $=_{\mathbf{d}\omega}$ **d**α, *e* $\subseteq_{\mathbf{d}\omega}$ *d*π];

-PST
^{P}[| **d**τ $<_{\mathbf{d}\omega}$ **d**ε]; [| *d*ε $\subseteq_{\mathbf{d}\omega}$ **d**τ];

there *fb*
^{P}[| ¬(*d*π $\bigcirc_{\mathbf{d}\omega}$ Π**d**ε)]; [| *d*ε $\subseteq_{\mathbf{d}\omega}$ *d*π];

overnight *ff*
[| *night.aft*{*d*ε_1} $\subseteq_{\mathbf{d}\omega}$ ϑ*d*ε]

(C4) Next *if*
^{P}[| $process_{\mathbf{d}\omega}$ *d*εε, *d*ε ∉ *d*εε, *d*ε_1 ∈ *d*εε]; [*e*| *e* = *d*εε(*d*ε_1)]; [**t**| **t** $=_{\mathbf{d}\omega}$ ϑ*d*ε];

he *ib*
^{P}[| *3sm* **d**α];

attack- *mf*
^{P}[| *d*εε: **d**α $climb.up.to_{\mathbf{d}\omega}$ *d*κ^{π}]; [*l*| *d*ε: $attack_{\mathbf{d}\omega}$ *l*];

-PST
^{P}[| **d**τ $<_{\mathbf{d}\omega}$ **d**ε]; [| *d*ε $\subseteq_{\mathbf{d}\omega}$ **d**τ]; [**t**| **t** $=_{\mathbf{d}\omega}$ ϑRS *d*ε];

the north face. *fb*
[| *d*π $north.face.of_{\mathbf{d}\omega}$ *d*β];

(C5) Twelve hours later *if*
[*e*| *twelve.hrs*(*d*ε, *e*)]; [**t**| **t** $=_{\mathbf{d}\omega}$ ϑ*d*ε];

he *ib*
^{P}[| *3sm* **d**α];

reach- *mf*
^{P}[| *d*εε: **d**α $climb.up.to_{\mathbf{d}\omega}$ *d*κ^{π}]; [*l*| *d*ε ∈ *d*εε, *l* $=_{\mathbf{d}\omega}$ *d*κ^{π}{*d*ε}];

-PST
^{P}[| **d**τ $<_{\mathbf{d}\omega}$ **d**ε]; [| *d*ε $\subseteq_{\mathbf{d}\omega}$ **d**τ]; [**t**| **t** $=_{\mathbf{d}\omega}$ ϑRS *d*ε];

the summit. *fb*
[| *d*π $=_{\mathbf{d}\omega}$ *d*κ^{π}{*d*ε}]; [| *d*π $=_{\mathbf{d}\omega}$ *summit.of* *d*β];

4. PUZZLE 2: NEW TOPIC TIME ≠ RESULT TIME

- ***New topic time = preparation time***

(D1) Mary *climbed* Mt. McKinley.

(D2) *The preparations…*

(D1) Mary *ib*
$^{P}[|\ \mathbf{d}\alpha \neq mary]; [\mathbf{a}|\ \mathbf{a} = mary];$

climb- *mf*
$[ee|\ ee\text{: } \mathbf{d}\alpha\ climb_{\mathbf{d}\omega}\ b];$

-PST
$^{P}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [|\ {}^{1}d\varepsilon\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta\text{RS}\ {}^{1}d\varepsilon\varepsilon];$

Mt. McKinley. *fb*
$[|\ d\beta = mt.mckinley];$

(D2) The *ib*
$^{P}[|\ d\varepsilon\varepsilon({}^{1}d\varepsilon\varepsilon) = {}^{f}d\varepsilon\varepsilon]; [h^{\varepsilon}|\ {}^{1}d\varepsilon\varepsilon \in_{\mathbf{d}\omega} \text{Ran}\ h^{\varepsilon}, {}^{f}d\varepsilon\varepsilon \notin_{\mathbf{d}\omega} \text{Ran}\ h^{\varepsilon}];$

prepar- -ation -s
$[|\ d\eta^{\varepsilon}\text{: AG}\ prepare.for\ \text{RS}]; [e|\ e =_{\mathbf{d}\omega} d\eta^{\varepsilon}\{\vartheta^{1}d\varepsilon\varepsilon\}]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta d\varepsilon];$

take- *mf*
$[k^{\tau}|\ k^{\tau}\{\cdot\} = \vartheta\{\cdot\}]; [|\ \mathbf{d}\tau =_{\mathbf{d}\omega} d\kappa^{\tau}\{d\varepsilon\}];$

-PST
$^{P}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [|\ d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta\text{RS}\ d\varepsilon];$

her *fb*
$^{P}[|\ \mathbf{d}\tau \neq \mathbf{d}\alpha, 3sf\ \mathbf{d}\alpha]; [a|\ a = \mathbf{d}\alpha]; [|\ \text{AG}\ d\varepsilon =_{\mathbf{d}\omega} d\alpha];$

longer than *ff*
$^{P}[|\ d\kappa^{\tau}\{\cdot\} = \vartheta\{\cdot\}]; [e|\ d\kappa^{\tau}\{d\varepsilon\}\ longer.than\ d\kappa^{\tau}\{e\}];$

the ascent
$^{P}[|\ d\varepsilon\varepsilon\text{: AG}\ climb_{\mathbf{d}\omega}\ d\beta]; [|\ d\varepsilon = {}^{f}d\varepsilon\varepsilon]$

- ‘***Simultaneous’ events***

|||||||||||||||||||

(E1) It *was* =======
an *eventful* summer. • • •
(E2) François |||||||||||||||||||
…*married* Adèle, •|||||||||||||…
(E3) Jean$_{F}$ |||||||||||||||||||
…*left* for Brasil •|||||||||||||||||…
(E4) , and Paul$_{F}$ |||||||||||||||||||
…*bought* a house. •|||||||||||||||||…

(E1) It
$[\mid 3sn\ d\sigma]; [\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta d\sigma];$

be-
$[k^{\tau}\mid \mathbf{d}\tau =_{\mathbf{d}\omega} k^{\tau}\{d\sigma\}];$

-PST
$^{P}[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [\mid \mathbf{d}\tau \subseteq_{\mathbf{d}\omega} d\sigma];$

an eventful summer
$[\mid d\kappa^{\tau}\{d\sigma\} =_{\mathbf{d}\omega} \mathbf{d}\tau]; {}^{P}[\mid d\kappa^{\tau}\{\cdot\} = \vartheta\{\cdot\}]; [\mid many_{d\kappa\tau}\ \varepsilon: d\kappa^{\tau}\{\varepsilon\} \subseteq_{\mathbf{d}\omega} d\kappa^{\tau}\{d\sigma\}]; [\mid summer\ d\kappa^{\tau}];$

(E2) François
$^{P}[\mid \mathbf{d}\alpha \neq françois]; [\mathbf{a}\mid \mathbf{a} = françois];$

marry-
$[e\ a\mid e: \mathbf{d}\alpha\ marry_{\mathbf{d}\omega}\ a]; {}^{I}[\mid d\kappa^{\tau}\{d\varepsilon\} \subseteq_{\mathbf{d}\omega} d\kappa^{\tau}\{d\sigma\}];$ *relevance implicature*

-PST
$^{P}[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [\mid d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ d\varepsilon];$

Adèle
$^{P}[\mid d\alpha \neq \mathbf{d}\alpha]; [\mid d\alpha = adèle];$

(E3) Jean (F + *ib*)[1]
$^{P}[\mid \mathbf{d}\alpha \neq jean]; [\mathbf{a}\mid \mathbf{a} = jean]; {}^{P}[\mid \mathbf{d}\tau_{1} \neq \mathbf{d}\tau]; [\mathbf{t}\mid \mathbf{t} = \mathbf{d}\tau_{1}];$ cf. Yukatek $=^{\top}$TM

leave-
$[e\ \mathscr{E}\mathscr{E}\mid (\mathscr{E}\mathscr{E}: \mathbf{d}\alpha\ travel), (e =_{\mathbf{d}\omega} {}^{1}\mathscr{E}\mathscr{E})]; {}^{I}[\mid d\kappa^{\tau}\{d\varepsilon\} \subseteq_{\mathbf{d}\omega} d\kappa^{\tau}\{d\sigma\}];$ *relevance implicature*

-PST
$^{P}[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [\mid d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ d\varepsilon];$

for Brasil
$[\mathscr{L}\mid {}^{f}d\ni\ni \subseteq \mathscr{L} \subseteq brasil];$

(E4) and Paul (F + *ib*)
$[\mathbf{a}\mid \mathbf{d}\alpha \neq \mathbf{a}]; [\mid \mathbf{d}\alpha = paul]; {}^{P}[\mid \mathbf{d}\tau_{1} \neq \mathbf{d}\tau]; [\mathbf{t}\mid \mathbf{t} = \mathbf{d}\tau_{1}];$ cf. Yukatek $=^{\top}$TM

buy-
$[e\ b\mid e: \mathbf{d}\alpha\ buy_{\mathbf{d}\omega}\ b]; {}^{I}[\mid d\kappa^{\tau}\{d\varepsilon\} \subseteq_{\mathbf{d}\omega} d\kappa^{\tau}\{d\sigma\}];$ *relevance implicature*

-PST
$^{P}[\mid \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [\mid d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}\mid \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ d\varepsilon];$

a house.
$[k^{\beta}\mid d\beta =_{\mathbf{d}\omega} k^{\beta}\{d\varepsilon\}]; [\mid house\ d\kappa^{\beta}];$

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[1] I am indebted to Sam Cumming for this idea.

5. PUZZLE 3: SUBORDINATE TIME LINES

(•) *Speech start up* •
(F1) John **went** into the florist shop. ▬||||||
(F2) He *had* promised Mary some flowers. •||||||||||||||||||||||||||
(F3) She *said* … •||||||||||||||||||||||||||||

~~~~~~~~~~~~~~~

(F4) …she <u>*would*</u> be upset ==
(F5) …if he <u>*forgot*</u>. ▬|||||

~~~~~~~~~~~~~~~

(F5) So he **picked** out ten beautiful roses. ▬||||

(F1) John *ib*
$[\mathbf{a}|\ \mathbf{a} = john]$;

go- *mf*
$[e\ k^{\pi}|\ e: \mathbf{d}\alpha\ go.to_{\mathbf{d}\omega}\ k^{\pi}]$;

-PST
$^{P}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [|\ d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ d\varepsilon]$;

into the florist shop *fb*
$[b|\ d\kappa^{\pi}\{d\varepsilon\} \subseteq_{\mathbf{d}\omega} in\{b\}]; [|\ d\beta =_{\mathbf{d}\omega} d\kappa^{\beta}\{d\varepsilon\}]; [|\ florist.shop\ d\kappa^{\beta}]$

(F2) He *ib*
$[|\ 3sm\ \mathbf{d}\alpha]$;

EE (*ha-*) *mf*
$[ee|\ process_{\mathbf{d}\omega}\ ee,\ {}^{f}ee = d\varepsilon]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta^{1}d\varepsilon\varepsilon]$;

-PST (*-d*)
$^{P}[|\ \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [|\ {}^{1}d\varepsilon\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}|\ \mathbf{t} =_{\mathbf{d}\omega} \vartheta\mathrm{RS}\ {}^{1}d\varepsilon\varepsilon]$;

promise-
$[e\ \mathscr{E}|\ (e: \mathbf{d}\alpha\ promise_{\mathbf{d}\omega}\ \mathscr{E}), (\mathscr{E} \subseteq \vartheta\mathrm{RS}\ e)]$;

-pprf
$[|\ d\varepsilon = {}^{1}d\varepsilon\varepsilon]$;

Mary *fb*
$[a|\ a = mary]; [|\ \mathrm{DA}\ d\varepsilon =_{\mathbf{d}\omega} d\alpha]$;

some flower- -s
$[\mathscr{B}\ k^{\beta}|\ \mathscr{B} =_{d\ni} k^{\beta}\{d\ni\}]; [|\ flower\ d\kappa^{\beta}]; [|\ pl_{d\ni}\{d\omega\beta, d\kappa^{\beta}\}]$

(F3) She *ib*
$^{P}[| \; 3sf\; d\alpha]; [\mathbf{a}| \; \mathbf{a} = d\alpha];$

say- *mf*
$[e\; p| \; e: \mathbf{d}\alpha\; say_{\mathbf{d}\omega}\; p]; {}^{I}[| \; d\varepsilon = d\varepsilon\varepsilon(d\varepsilon)];$

-PST
$^{P}[| \; \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [| \; d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathcal{T}| \; \mathcal{T} = (\vartheta\text{RS}\; d\varepsilon| \; d\Omega)];$

(F4) she *fb*: *ib*
$[| \; 3sf\; \mathbf{d}\alpha];$

E.FUT (*would*) *fb*: *mf*
$^{P}[| \; d\varepsilon < \mathbf{d}\omega\tau]; [\mathcal{E}| \; \mathcal{E} \subseteq \mathbf{d}\omega\tau]; [\mathcal{T}| \; \mathcal{T} = \vartheta\text{RS}\; d\ni];$

be
$[\mathcal{S}\; k^{\alpha}| \; \mathbf{d}\alpha = k^{\alpha}\{\mathcal{S}\}]; [| \; d\omega\sigma = \text{RS}\; d\ni];$

upset
$[| \; d\kappa^{\alpha}\; upset.about\; d\ni];$

(F5) if *ff*: *if*
$^{P}[| \; d\ni_1 \subseteq \vartheta\text{RS}\; d\varepsilon_1]; [\mathcal{S}| \; \mathcal{S} = (\text{RS}\; d\varepsilon_1| \; \text{Dom}\; \mathbf{d}\omega\tau)]; [\mathcal{T}| \; \mathcal{T} = \vartheta d\omega\sigma];$

he *ff*: *ib*
$^{P}[| \; 3sm\; \mathbf{d}\alpha_1]; [\mathbf{a}| \; \mathbf{a} = \mathbf{d}\alpha_1];$

forget-[1] *ff*: *mf*
$^{P}[| \; d\omega\sigma =_{\mathbf{d}\omega\tau} \text{RS}\; d\varepsilon_1, d\ni_1 \subseteq \vartheta\text{RS}\; d\varepsilon_1]; [| \; \text{AG}\; d\ni = \mathbf{d}\alpha, d\ni =_{\mathbf{d}\omega\tau} \sim d\ni_1];$

-PST
$^{P}[| \; \mathbf{d}\omega\tau < \vartheta_{\mathbf{d}\omega}\; \mathbf{d}\varepsilon]; [| \; d\ni \subseteq \mathbf{d}\omega\tau]; [\mathcal{T}| \; \mathcal{T} = \vartheta\text{RS}\; d\ni];$

(F6) So *ib*
$[\mathbf{t}| \; \mathbf{t} =_{\mathbf{d}\omega} \vartheta\text{RS}\; {}^{f}d\varepsilon\varepsilon];$

he
$[| \; 3sm\; \mathbf{d}\alpha];$

pick.out-
$[e\; b| \; e: \mathbf{d}\alpha\; pick.out_{\mathbf{d}\omega}\; b]; [| \; d\varepsilon =_{\mathbf{d}\omega} d\ni_1];$

-PST
$^{P}[| \; \mathbf{d}\tau <_{\mathbf{d}\omega} \mathbf{d}\varepsilon]; [| \; d\varepsilon \subseteq_{\mathbf{d}\omega} \mathbf{d}\tau]; [\mathbf{t}| \; \mathbf{t} =_{\mathbf{d}\omega} \vartheta\text{RS}\; d\varepsilon];$

ten beautiful rose- -s
$[k^{\beta}| \; ten(d\beta, k^{\beta})]; [| \; beautiful(d\beta, d\kappa^{\beta})]; [| \; {*rose}\; d\kappa^{\beta}]; [| \; pl\{d\beta, d\kappa^{\beta}\}]$

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[1] • In any $\mathbf{d}\omega\tau$-world, $d\ni$ is failure to realize $d\ni_1$

$$d\ni =_{\mathbf{d}\omega\tau} \sim d\ni_1 \quad := \quad \lambda i.\; \exists a(\forall w \in \text{Dom}\; \mathbf{d}\omega\tau_i \forall w' \in \text{Dom}\; d\ni_{1i}: a = \text{AG}_w\, d\ni_i w = \text{AG}_{w'}\, d\ni_{1i} w')$$
$$\exists t(\forall w \in \text{Dom}\; \mathbf{d}\omega\tau_i \forall w' \in \text{Dom}\; d\ni_{1i}: t = \mathbf{d}\omega\tau_i w \wedge \vartheta_{w'}\, d\ni_{1i} w' \subseteq t$$
$$\wedge \neg\exists e(e = d\ni_i w \wedge \vartheta_w\, e \subseteq t))$$