Nominal (re)centering: From Kalaallisut to UC_1

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1. OUTLINE OF CCG+UC_1 THEORY

- Language-specific lexicon + universal CCG-rules (to be given on **M2**) translate NL-syntax into UC_1-syntax:

(1)	*A man saw an enemy.*	Eng. syn.
(1′)	$[\mathbf{x}|\ man\langle\mathbf{x}\rangle];\ ([y|\ enm^{of}\langle y, \top\rangle];\ [see\langle\top, \bot\rangle])$	UC_1 syn.

- A UC_1-model $M = \langle\{D_a|\ a \in \Theta\}, [\![\cdot]\!]\rangle$ assigns to each constant of type a, $A \in Con_a$ a value which is an object of type a, $[\![A]\!] \in D_a$.

  e.g. Here's a possible UC_1-model (call it M_0):
  $D_e = \{a, a'\}$ $\qquad [\![enm^{of}]\!] = {}^{\chi}\{\langle a, a'\rangle, \langle a', a\rangle\}$
  $[\![man]\!] = {}^{\chi}\{a, a'\}$ $\qquad [\![see]\!] = {}^{\chi}\{\langle a, a'\rangle\}$

- Given model $M = \langle\{D_a|\ a \in \Theta\}, [\![\cdot]\!]\rangle$ and assignment g, UC_1-semantics
  i. extends $[\![\cdot]\!]$ to $[\![\cdot]\!]^g$, which assigns a value $[\![A]\!]^g$ to each UC_1-term A
  ii. defines the *default state* of information-&-attention: $c_0 = \{\langle\langle\ \rangle, \langle\ \rangle\rangle\}$
  (read: in c_0 there are no $\top$- or $\bot$-objects available for anaphora)

  e.g. In M_0, for any g, UC_1-semantics determines the effect of (1′) on the default state c_0 to be the following sequence of updates:

$c_0[\![[\mathbf{x}|\ man\langle\mathbf{x}\rangle]]\!]^g$	$c_1[\![[y|\ enm^{of}\langle y, \top\rangle]]\!]^g$	$c_2[\![[see\langle\top, \bot\rangle]]\!]^g$
$= \{\langle\langle a\rangle, \langle\ \rangle\rangle,$	$= \{\langle\langle a\rangle, \langle a'\rangle\rangle,$	$= \{\langle\langle a\rangle, \langle a'\rangle\rangle\}$
$\langle\langle a'\rangle, \langle\ \rangle\rangle\}$	$\langle\langle a'\rangle, \langle a\rangle\rangle\}$	$=: c_3$
$=: c_1$	$= c_2$	
(introduce a man as topic, $\top$)	(introduce an enemy of the $\top$-man as bckgrnd, $\bot$)	(test: the $\top$-man saw the $\bot$-enemy)

- Truth definition:
  A UC_1-discourse representation K is *true* in a model M, written $M_0 \models K$, iff $\forall g$: $c_0[\![K]\!]^g \neq \varnothing$ (read: c_0 updated with $[\![K]\!]^g$ is not the absurd state).

  e.g. Since $c_3 \neq \varnothing$, UC_1 (1′) is *true* in the model M_0 (i.e. $M_0 \models$ (1′)).
  PREDICT: Eng. (1) will be judged *true* in (situation represented by) M_0.

2. UPDATE WITH NOMINAL CENTERING (UC_1)

DEFINITION 1 (Lists & infotention states) Let D be a non-empty set.
- $\langle D\rangle^{n,m} = D^n \times D^m$ is the set of $\top\bot$-*lists* of n topical D-objects (the $\top$-*list*) and m background D-objects (the $\bot$-*list*).
- For any $\top\bot$-list $i = \langle i_1, i_2\rangle \in \langle D\rangle^{n,m}$, $\top i = i_1$ and $\bot i = i_2$. Thus, $i = \langle\top i, \bot i\rangle$.
- An *n,m-infotention state* is any subset of $\langle D\rangle^{n,m}$. $\varnothing$ is the *absurd state.*

DEFINITION 2 (UC_1 types) The set of UC_1 *types* is the smallest set Θ such that (i) $\{t, e\} \subseteq \Theta$, (ii) if $a, b \in \Theta$, then $(ab) \in \Theta$, and (iii) $s \in \Theta$.

DEFINITION 3 (UC_1 frames) A UC_1 *frame* is a set $\{D_a|\ a \in \Theta\}$ of non-empty pairwise disjoint sets D_a s.t. (i) $D_t = \{1, 0\}$, (ii) $D_{ab} = \{f|\ \varnothing \subset \mathrm{Dom}\ f \subseteq D_a \wedge \mathrm{Ran}\ f \subseteq D_b\}$, and (iii) $D_s = \cup_{n,\,m\,\geq\,0} \langle D_e\rangle^{n,m}$.

DEFINITION 4 (UC_1 syntax) Define for all $a \in \Theta$ the set of a-terms as follows
i. $Con_a \cup {}^{\top}Var_a \cup {}^{\bot}Var_a \subseteq Term_a$
ii. $\lambda u_a(B) \in Term_{ab}$, if $u_a \in {}^{\top}Var_a \cup {}^{\bot}Var_a$ and $B \in Term_b$
iii. $BA \in Term_b$, if $B \in Term_{ab}$ and $A \in Term_a$
iv. $\neg A$, $(A \rightarrow B)$, $(A \wedge B)$, $(A \vee B) \in Term_t$, if $A, B \in Term_t$
v. $\forall u_a B$, $\exists u_a B \in Term_t$, if $u_a \in {}^{\top}Var_a \cup {}^{\bot}Var_a$ and $B \in Term_t$
vi. $(A = B) \in Term_t$, if $A, B \in Term_a$
vii. $(u \cdot B) \in Term_s$, if $u \in {}^{\top}Var_e \cup {}^{\bot}Var_e$ and $B \in Term_s$
viii. $\top_n, \bot_n \in Term_{se}$, if $n \geq 1$.
ix. $A\{B\} \in Term_{et}$, if $A \in Term_{se}$ and $B \in Term_{st}$
x. $\downarrow A$, $(A; B)$, $(A^{\top}; B)$, $(A^{\bot}; B) \in Term_{(st)st}$, if $A, B \in Term_{(st)st}$

REMARK:	$A\{B\}$	is the *global value* of anaphor A_{se} in state B_{st}
	$\downarrow A$	is the *static closure* of drs A
	$(A^{\top}; B)$	is a *topic-comment sequence* of drs's A and B
	$(A^{\bot}; B)$	is a *background-elaboration sequence* of drs's A and B

DEFINITION 5 (UC_1 models) A UC_1 model is a pair $M = \langle\{D_a|\ a \in \Theta\}, [\![\cdot]\!]\rangle$, where $\{D_a|\ a \in \Theta\}$ is a UC_1 frame, and $[\![\cdot]\!]$ assigns to each $A \in Con_a$ a value $[\![A]\!] \in D_a$.

ABBREVIATIONS 1 (Projections & dot-extensions). For any non-empty set D,
- $(x)_n$ = the nth coordinate, x_n $\qquad$ for $x \in D^{n+m}$
- $(d \cdot x) = \langle d, x_1, \ldots, x_n\rangle$ $\qquad$ for $d \in D$, $x \in D^n$
- $y \cdot\!> x$ iff $y = (y_1 \cdot \ldots (y_m \cdot x))$ $\qquad$ for $y \in D^{m+n}$, $x \in D^n$

ABBREVIATIONS 2 For $f \in D_{a_1 \ldots a_n t}$, $\langle \mathsf{a}_1, \ldots, \mathsf{a}_n \rangle \in D_{a_1} \times \ldots D_{a_n}$, $A \subseteq D_{a_1} \times \ldots D_{a_n}$:

- $f(\mathsf{a}_1, \ldots, \mathsf{a}_n) := f(\mathsf{a}_1)\ldots(\mathsf{a}_n)$,
- ${}^{\{\}}f := \{\langle \mathsf{a}_1, \ldots, \mathsf{a}_n \rangle | \ f(\mathsf{a}_1, \ldots, \mathsf{a}_n) = 1\}$ (*set characterized* by f)
- ${}^{\chi}A = \iota f \in D_{a_1 \ldots a_n t}.(A = {}^{\{\}}f)$ (*characteristic function* of A)

DEFINITION 6 (UC$_1$ semantics). The value $\llbracket A \rrbracket^g$ of a term A given $\llbracket \cdot \rrbracket$ and an assignment g is defined as follows (we write (i) '$X \doteq Y$' for 'X is Y, if Y is defined, else X is undefined', (ii) '$\mathsf{c}\llbracket X \rrbracket$' for '$\llbracket X \rrbracket(\mathsf{c})$', for any $\mathsf{c} \in D_{st}$ (iii) '$X[Y/Z]$' for the result of replacing every occurrence of Y in X with Z, and (iv) use the Von Neumann definition, so $0 = \varnothing$ and $1 = \{\varnothing\}$):

i. $\llbracket u \rrbracket^g = g(u)$ for any $u \in {}^{\top}Var_a \cup {}^{\perp}Var_a$

$\llbracket A \rrbracket^g = \llbracket A \rrbracket$ for any $A \in Con_a$

ii. $\llbracket \lambda u_a(B) \rrbracket^g(\mathsf{d}) \doteq \llbracket B \rrbracket^{g[u/\mathsf{d}]}$ for any $\mathsf{d} \in D_a$

iii. $\llbracket BA \rrbracket^g \doteq \llbracket B \rrbracket^g(\llbracket A \rrbracket^g)$

iv. $\llbracket \neg A \rrbracket^g \doteq 1 \backslash \llbracket A \rrbracket^g$

$\llbracket A \rightarrow B \rrbracket^g \doteq 1 \backslash (\llbracket A \rrbracket^g \backslash \llbracket B \rrbracket^g)$

$\llbracket A \wedge B \rrbracket^g \doteq \llbracket A \rrbracket^g \cap \llbracket B \rrbracket^g$

$\llbracket A \vee B \rrbracket^g \doteq \llbracket A \rrbracket^g \cup \llbracket B \rrbracket^g$

v. $\llbracket \forall u_a A \rrbracket^g \doteq \bigcap_{\mathsf{d} \in D_a} \llbracket A \rrbracket^{g[u/\mathsf{d}]}$

$\llbracket \exists u_a A \rrbracket^g \doteq \bigcup_{\mathsf{d} \in D_a} \llbracket A \rrbracket^{g[u/\mathsf{d}]}$

vi. $\llbracket A = B \rrbracket^g = |\{\langle \mathsf{d}, \mathsf{d}' \rangle \in D_a{}^2 | \ \mathsf{d} = \llbracket A \rrbracket^g \wedge \mathsf{d}' = \llbracket B \rrbracket^g \wedge \mathsf{d} = \mathsf{d}'\}|$

vii. $\llbracket u \cdot B_s \rrbracket^g \doteq \langle (g(u) \cdot \top\llbracket B \rrbracket^g), \perp\llbracket B \rrbracket^g \rangle$ for any $u \in {}^{\top}Var_e$

$\doteq \langle \top\llbracket B \rrbracket^g, (g(u) \cdot \perp\llbracket B \rrbracket^g) \rangle$ for any $u \in {}^{\perp}Var_e$

viii. $\llbracket \top_n \rrbracket^g(\mathsf{i}) \doteq (\top\mathsf{i})_n$ for any $\mathsf{i} \in D_s$

$\llbracket \perp_n \rrbracket^g(\mathsf{i}) \doteq (\perp\mathsf{i})_n$

ix. $\llbracket A\{B\} \rrbracket^g \doteq {}^{\chi}\{\llbracket A \rrbracket^g(\mathsf{i}) | \ \mathsf{i} \in {}^{\{\}}\llbracket B \rrbracket^g\}$

x. $\mathsf{c}\llbracket \downarrow A \rrbracket^g \doteq {}^{\chi}\{\mathsf{i} \in {}^{\{\}}\mathsf{c} | \ \exists \mathsf{j}: \top\mathsf{j} \cdot\!\geq \top\mathsf{i} \wedge \perp\mathsf{j} \cdot\!\geq \perp\mathsf{i} \wedge \mathsf{j} \in {}^{\{\}}(\mathsf{c}\llbracket A \rrbracket^g)\}$

$\mathsf{c}\llbracket A; B \rrbracket^g \doteq \mathsf{c}\llbracket A \rrbracket^g \llbracket B \rrbracket^g$

$\mathsf{c}\llbracket A^{\top}; B \rrbracket^g \doteq \{\mathsf{l} \in \mathsf{c}\llbracket A; B \rrbracket^g | \ \forall \mathsf{k} \in \mathsf{c}\llbracket A; B \rrbracket^g \exists \mathsf{j} \in \mathsf{c}\llbracket A \rrbracket^g \exists \mathsf{i} \in \mathsf{c} \exists \mathsf{d} \in D_e$:
$\top\mathsf{k} \cdot\!\geq \top\mathsf{j} \cdot\!> \top\mathsf{i} \wedge (\top\mathsf{j})_1 = \mathsf{d} \wedge \llbracket B \rrbracket^g \neq \llbracket B[\top_1/\perp_1] \rrbracket^g \wedge (\top\mathsf{j})_1 = \mathsf{d}\}$

$\mathsf{c}\llbracket A^{\perp}; B \rrbracket^g \doteq \{\mathsf{l} \in \mathsf{c}\llbracket A; B \rrbracket^g | \ \forall \mathsf{k} \in \mathsf{c}\llbracket A; B \rrbracket^g \exists \mathsf{j} \in \mathsf{c}\llbracket A \rrbracket^g \exists \mathsf{i} \in \mathsf{c} \exists \mathsf{d} \in D_e$:
$\perp\mathsf{k} \cdot\!\geq \perp\mathsf{j} \cdot\!> \perp\mathsf{i} \wedge (\perp\mathsf{j})_1 = \mathsf{d} \wedge \llbracket B \rrbracket^g \neq \llbracket B[\perp_1/\top_1] \rrbracket^g \wedge (\perp\mathsf{j})_1 = \mathsf{d}\}$

DEFINITION 7 (UC$_1$ defaults). $\mathsf{c}_0 = {}^{\chi}\{\langle\langle\ \rangle, \langle\ \rangle\rangle\}$ is the default state.

DEFINITION 8 (Truth) An $(st)st$ term K is *true* in M iff $\forall g$: $\mathsf{c}_0\llbracket K \rrbracket^g \neq \varnothing$

3. TO MAKE LIFE EASIER…

- Table 1 (UC$_1$ variables)

$a \in \Theta$	Abbrev.	${}^{\top}Var_a$	${}^{\perp}Var_a$	Name of objects
e		$\mathbf{x}, \mathbf{y}$	x, y, z	individuals
s			i, j	$\top\perp$-lists
st			I, J	infotention states

- Table 2 (Syntactic sugar)

	Abbrev.	for	UC term	Example
i.	Static relations			
	$A_a \neq B_a$	for	$\neg(A = B)$	$\top_1 i \neq x$
	$A_a \in B_{at}$	for	BA	$\perp_2 j \in \perp_1\{I\}$
ii.	Local projections ($\mathbf{R} \in \{=, \neq\}$)			
	$\top, \perp$	for	$\top_1, \perp_1$	$\top, \perp$
	$A_e{}^\circ$	for	$\lambda i.\ A$	$\mathbf{x}^\circ, x^\circ$
	$A_{se}{}^\circ$	for	$\lambda i.\ Ai$	$\top^\circ, \perp^\circ$
	$A\ \mathbf{R}_i\ B$	for	$\lambda i.\ A^\circ i\ \mathbf{R}\ B^\circ i$	$(\top \neq_i x)$
	$B\langle A_1, \ldots A_n \rangle$	for	$\lambda i.\ B\ A_1{}^\circ i \ldots A_n{}^\circ i$	$enm^{of}\langle y, \top \rangle$
	(C_1, C_2)	for	$\lambda i.\ C_1 i \wedge C_2 i$	
iii.	Local drt-boxes			
	$[u]$	for	$\lambda Ij.\ \exists u \exists i(j = (u \cdot i) \wedge Ii)$	$[\mathbf{x}]$
	$[C]$	for	$\lambda Ij.\ Ij \wedge Cj$	$[man\ \perp]$
	$[u \mid C]$	for	$\lambda Ij.\ \exists u \exists i(j = (u \cdot i) \wedge Ii \wedge Ci)$	$[y \mid enm^{of}\langle y, \top \rangle]$
iv.	Global drt-boxes			
	$[A_{se} \in B_{se} \|\|]$	for	$\lambda Ij.\ Ij \wedge Aj \in B\{I\})$	$[\perp_2 \in \perp \|\|]$

- A UC$_1$-model for *Once upon a time in the Far North*:
$D = \{\mathsf{a}, \mathsf{a}', \mathsf{b}, \mathsf{b}'\}$

$\llbracket man \rrbracket = {}^{\chi}\{\mathsf{a}, \mathsf{a}'\}$	$\llbracket enm^{of} \rrbracket = {}^{\chi}\{\langle \mathsf{a}, \mathsf{a}' \rangle, \langle \mathsf{a}', \mathsf{a} \rangle\}$
$\llbracket kayak \rrbracket = {}^{\chi}\{\mathsf{b}, \mathsf{b}'\}$	$\llbracket use \rrbracket = {}^{\chi}\{\langle \mathsf{a}, \mathsf{b} \rangle, \langle \mathsf{a}', \mathsf{b}' \rangle\}$
$\llbracket lie.in.wait \rrbracket = {}^{\chi}\{\mathsf{a}, \mathsf{a}'\}$	$\llbracket see \rrbracket = {}^{\chi}\{\langle \mathsf{a}, \mathsf{a}' \rangle, \langle \mathsf{a}', \mathsf{a} \rangle, \langle \mathsf{a}, \mathsf{b}' \rangle, \langle \mathsf{a}', \mathsf{b} \rangle\}$
$\llbracket capsize \rrbracket = {}^{\chi}\{\mathsf{a}\}$	$\llbracket approach \rrbracket = {}^{\chi}\{\langle \mathsf{a}, \mathsf{a}' \rangle, \langle \mathsf{a}, \mathsf{b}' \rangle\}$
$\llbracket die \rrbracket = {}^{\chi}\{\mathsf{a}\}$	$\llbracket int.to.harpoon \rrbracket = {}^{\chi}\{\langle \mathsf{a}, \mathsf{a}' \rangle, \langle \mathsf{a}', \mathsf{a} \rangle\}$
$\llbracket go.hm \rrbracket = {}^{\chi}\{\mathsf{a}'\}$	$\llbracket forestall \rrbracket = {}^{\chi}\{\langle \mathsf{a}', \mathsf{a} \rangle\}$
$\llbracket tell.story \rrbracket = {}^{\chi}\{\mathsf{a}'\}$	$\llbracket harpoon \rrbracket = {}^{\chi}\{\langle \mathsf{a}', \mathsf{a} \rangle\}$
$\llbracket pos \rrbracket(\mathsf{b}) = \mathsf{a}$	$\llbracket kill \rrbracket = {}^{\chi}\{\langle \mathsf{a}', \mathsf{a} \rangle\}$
$\llbracket pos \rrbracket(\mathsf{b}') = \mathsf{a}'$	

4. FROM KALAALLISUT TO UC_1

- <u>Once upon a time in the Far North (*Kalaallisut*)</u>

(1) (Long ago) there was a man who had (an) enemy(ies).

angut-qar-pu-q *akiraq-lik-mik.* — *Kal. syn*
man-have-DEC_{iv}-3S enemy-with-MOD
$[y|\ man\langle y\rangle];\ {\downarrow}[y|\ enm^{of}\langle y, \bot\rangle]$ — *UC_1 syn*

$c_0[\![[y|\ man\langle y\rangle]]\!]^g = \{\langle\langle\,\rangle, \langle a\rangle\rangle, \langle\langle\,\rangle, \langle a'\rangle\rangle\} =: c_1$

$c_1[\![{\downarrow}[y|\ enm^{of}\langle y, \bot\rangle]]\!]^g = \{\langle\langle\,\rangle, \langle a\rangle\rangle, \langle\langle\,\rangle, \langle a'\rangle\rangle\} =: c_2$ — *UC_1 sem*

(2,3)[1] (Once) when he$^{\top}$ was hunting in a kayak …

qajaq-tur-llu-ni
kayak-use-$\text{ELA}_{\top}$-$3\text{S}_{\top}$
$[\mathbf{x}|\ \mathbf{x} =_i \bot];\ [y|\ kayak\langle y\rangle, use\langle \top, y\rangle];$

$c_2[\![[\mathbf{x}|\ \mathbf{x} =_i \bot]]\!]^g = \{\langle\langle a\rangle, \langle a\rangle\rangle, \langle\langle a'\rangle, \langle a'\rangle\rangle\} =: c_3$

$c_3[\![[y|\ kayak\langle y\rangle, use\langle \top, y\rangle]]\!]^g = \{\langle\langle a\rangle, \langle b, a\rangle\rangle, \langle\langle a'\rangle, \langle b', a'\rangle\rangle\} =: c_4$

[2] he$_{\top}$ saw another kayak$_{\text{MOD}}$ …;

alla-mik *qajaq-si-ga-mi*
other-MOD kayak-see-$\text{FCT}_{\top}$-$3\text{S}_{\top}$
$[y|\ kayak\langle y\rangle];\ [\bot_2 \in \bot||];\ [\bot \neq_i \bot_2];\ [see\langle \top, \bot\rangle];$

$c_4[\![[y|\ kayak\langle y\rangle]]\!]^g = \{\langle\langle a\rangle, \langle b, b, \ldots\rangle\rangle, \langle\langle a\rangle, \langle b', b, \ldots\rangle\rangle, \langle\langle a'\rangle, \langle b, b', \ldots\rangle\rangle, \langle\langle a'\rangle, \langle b', b', \ldots\rangle\rangle\} =: c_5$

$c_5[\![[\bot_2 \in \bot||]]\!]^g = \{\langle\langle a\rangle, \langle b, b, \ldots\rangle\rangle, \langle\langle a\rangle, \langle b', b, \ldots\rangle\rangle, \langle\langle a'\rangle, \langle b, b', \ldots\rangle\rangle, \langle\langle a'\rangle, \langle b', b', \ldots\rangle\rangle\} =: c_6$

$c_6[\![[\bot \neq_i \bot_2]]\!]^g = \{\langle\langle a\rangle, \langle b', b, \ldots\rangle\rangle, \langle\langle a'\rangle, \langle b, b', \ldots\rangle\rangle\} =: c_7$

$c_7[\![see\langle \top, \bot\rangle]\!]^g = \{\langle\langle a\rangle, \langle b', b, \ldots\rangle\rangle, \langle\langle a'\rangle, \langle b, b', \ldots\rangle\rangle\} =: c_8$

[3, 4] approaching it$^{\bot}$ …

urnig-llu-gu
approach-$\text{ELA}_{\top}3\text{S}_{\bot}$

$c_8[\![[approach\langle \top, \bot\rangle, \top \neq_i \bot]]\!]^g = \{\langle\langle a\rangle, \langle b', b, \ldots\rangle\rangle\} =: c_9$

he$_{\top}$ saw (it was) his$_{\top}$ enemy$^{\bot}$ lying in wait.

taku-pa-a-Ø *akiraq-ni-Ø* *qama-tu-q*
see-DEC_{tv}-3S-3S enemy-$3\text{S}_{\top}$-$^{\bot}$ lie.in.wait-$\text{ELA}_{iv\bot}$-$3\text{S}_{\bot}$
$[enm^{of}\langle pos\langle\bot\rangle, \top\rangle];\ [y|\ y =_i pos\langle\bot\rangle];\ [see\langle \top, \bot\rangle, \top \neq_i \bot];\ [lie.in.wait\langle\bot\rangle]$

$c_9[\![[enm^{of}\langle pos\langle\bot\rangle, \top\rangle]]\!]^g = \{\langle\langle a\rangle, \langle b', b, \ldots\rangle\rangle\} =: c_{10}$

$c_{10}[\![[y|\ y = pos\langle\bot\rangle]]\!]^g = \{\langle\langle a\rangle, \langle a', b', \ldots\rangle\rangle\} =: c_{11}$

$c_{11}[\![[see\langle \top, \bot\rangle, \top \neq_i \bot]]\!]^g = \{\langle\langle a\rangle, \langle a', b', \ldots\rangle\rangle\} =: c_{12}$

$c_{12}[\![[lie.in.wait\langle\bot\rangle]]\!]^g = \{\langle\langle a\rangle, \langle a', b', \ldots\rangle\rangle\} =: c_{13}$

(4) He$_{\top}$ intended to harpoon him$_{\bot}$ but HE$^{\top}$, ……

nalig-niar-galuar-llu-gu *tass-uma*
harpoon-intend-rem-$\text{ELA}_{\top}$-$3\text{S}_{\bot}$ that-$\text{ERG}^{\top}$
$[int.to.harpoon\langle \top, \bot\rangle];$ $[\mathbf{x}|\ \mathbf{x} =_i \bot]$

$c_{13}[\![[int.to.harpoon\langle \top, \bot\rangle]]\!]^g = \{\langle\langle a\rangle, \langle a', b', \ldots\rangle\rangle\} =: c_{14}$

$c_{14}[\![[\mathbf{x}|\ \mathbf{x} =_i \bot]]\!]^g = \{\langle\langle a', a\rangle, \langle a', b', \ldots\rangle\rangle\} =: c_{15}$

forestalling him$_{\bot}$, harpooned him$_{\bot}$ (instead).

ingiar-llu-gu *nalig-pa-a-Ø*
forestall-$\text{ELA}_{tv\top}$-$3\text{S}_{\bot}$ harpoon-DEC_{tv}-3S-3S
$[forestall\langle \top, \top_2\rangle];\ [y|\ y =_i \top_2, y \neq_i \top];\ [harpoon\langle \top, \bot\rangle, \top \neq_i \bot]$

$c_{15}[\![[forestall\langle \top, \top_2\rangle]]\!]^g = \{\langle\langle a', a\rangle, \langle a', b, \ldots\rangle\rangle\} =: c_{16}$

$c_{16}[\![[y|\ y =_i \top_2, y \neq_i \top]]\!]^g = \{\langle\langle a', a\rangle, \langle a, a', \ldots\rangle\rangle\} =: c_{17}$

$c_{17}[\![[harpoon\langle \top, \bot\rangle, \top \neq_i \bot]]\!]^g = \{\langle\langle a', a\rangle, \langle a, a', \ldots\rangle\rangle\} =: c_{18}$

(5) The$^\top$ man he$^\bot$ harpooned …
nalig-taq-a
harpoon-rn\tv-3S$_\bot$-$^\top$
[*harpoon*$\langle\top, \bot\rangle$]; [y| $y =_i \top$, $y \neq_i \bot$]; [**x**| **x** $=_i \bot_2$];

$c_{18}[\![[harpoon\langle\top, \bot\rangle]]\!]^g$ $= \{\langle\langle a', a\rangle, \langle a, a', \ldots\rangle\rangle\}$ $=: c_{19}$

$c_{19}[\![[y|\ y = \top, y \neq \bot]]\!]^g$ $= \{\langle\langle a', a\rangle, \langle a', a, \ldots\rangle\rangle\}$ $=: c_{20}$

$c_{20}[\![[\mathbf{x}|\ \mathbf{x} =_i \bot_2]]\!]^g$ $= \{\langle\langle a, a', \ldots\rangle, \langle a', a, \ldots\rangle\rangle\}$ $=: c_{21}$

capsized and drowned.
kingu-llu-ni *ipi-pu-q*
capsize-ELA$_\top$-3S$_\top$ drown-DEC$_{iv}$-3S
[*capsize*$\langle\top\rangle$]; [*drown*$\langle\top\rangle$]

$c_{21}[\![[capsize\langle\top\rangle]]\!]^g$ $= \{\langle\langle a, a', \ldots\rangle, \langle a', a, \ldots\rangle\rangle\}$ $=: c_{22}$

$c_{22}[\![[drown\langle\top\rangle]]\!]^g$ $= \{\langle\langle a, a', \ldots\rangle, \langle a', a, \ldots\rangle\rangle\}$ $=: c_{23}$

(6)[1] When he$^\bot$ was dead the killer$^\top$ went home and told the story.
tuqu-mm-at *tuqut-si-tuq-Ø* *angirlar-ga-mi* *uqaluttuar-pu-q*
die-FCT$_\bot$-3S$_\bot$ kill-antip-cn\iv-$^\top$ go.home-FCT$_\top$-3S$_\top$ tell.story-DEC$_{iv}$-3S
[*die*$\langle\top\rangle$]; [y| $y =_i \top$]; [*kill*$\langle\top_2, \bot\rangle$]; [**x**| **x** $=_i \top_2$]; [*go.hm*$\langle\top\rangle$]; [*tell.story*$\langle\top\rangle$]

$c_{23}[\![[die\langle\top\rangle]]\!]^g$ $= \{\langle\langle a, a', \ldots\rangle, \langle a', a, \ldots\rangle\rangle\}$ $=: c_{24}$

$c_{24}[\![[y|\ y =_i \top]]\!]^g$ $= \{\langle\langle a, a', \ldots\rangle, \langle a, a', \ldots\rangle\rangle\}$ $=: c_{25}$

$c_{25}[\![[kill\langle\top_2, \bot\rangle]]\!]^g$ $= \{\langle\langle a, a', \ldots\rangle, \langle a, a', \ldots\rangle\rangle\}$ $=: c_{26}$

$c_{26}[\![[\mathbf{x}|\ \mathbf{x} =_i \top_2]]\!]^g$ $= \{\langle\langle a', a, \ldots\rangle, \langle a, a', \ldots\rangle\rangle\}$ $=: c_{27}$

$c_{27}[\![[go.hm\langle\top\rangle]]\!]^g$ $= \{\langle\langle a', a, \ldots\rangle, \langle a, a', \ldots\rangle\rangle\}$ $=: c_{28}$

$c_{28}[\![[tell.story\langle\top\rangle]]\!]^g$ $= \{\langle\langle a', a, \ldots\rangle, \langle a, a', \ldots\rangle\rangle\}$ $= c_{29}$

- CONCLUSION: Since $c_{29} \neq \varnothing$ this UC_1 drs is *true* in the given model
  PREDICTION: The Kalaallisut text (represented by this UC_1 drs) will be judged *true* in (the situation represented by) the given model.

<u>Appendix: Dash of Kalaallisut grammar</u>:

Ling. type: polysynthetic morphology (Sapir 1921)
'free' word order (head final default)

Categories: *verbs* inflect for mood and pronominal 'agreement' (pn)
- iv (intransitive) require subject pn
- tv (transitive) require subject pn_1 + object pn_2

nouns inflect for nominal agreement and case
- cn (common noun) require number -Ø (singular) | -PL
- rn (relational noun) require possessor pn + number -Ø | PL

particles don't inflect

Centering: $\top$ = topic, $\bot$ = background
$pn_\top$ = $\top$-pronoun, or update antecedent to $\top$
$pn_\bot$ = $\bot$-pronoun, or update antecedent to $\bot$

Case: -$^{\top|\bot}$ = absolutive (iv subject, tv object) … -$pn_\top$ | -$pn_\bot$
-ERG$^{\top|\bot}$ = ergative (tv subject, rn possessor) … -$pn_\top$ | -$pn_\bot$
-MOD = modifier (of head x, where x ∈ {iv, tv, cn, rn})

Mood: matrix moods mark illocutionary force, e.g.
- DEC$_{iv}$ = declarative iv (main assertion about $\top$)
- DEC$_{tv}$ = declarative tv (main assertion relating $\top$ to $\bot$)

dependent moods mark subject centering, e.g.
- ELA$_\top$ = elaboration of $\top$, ELA$_\bot$ = elaboration of $\bot$
- FCT$_\top$ = background fact abt $\top$, FCT$_\bot$ = background fact abt $\bot$

Derivation: hundreds of derivational suffixes, including:
- -antip = antipassive
- -rem = remote modality (unrealized, unexpected, undesired)
- -x\y = derives x from y (e.g. nominalizers -rn\tv, -cn\iv, …)