# BARE PLURALS AS REFERENCE TO KINDS

## 1 CARLSON 1977: EMPIRICAL OBSERVATIONS

**Obs 1:** Bare plurals have three readings, all of which can be paraphrased by *this* | *that kind*

∃. *existential* bare plural
e.g. (1) *dogs* | *sm dogs* are available ~ (2) *this kind of animal* is available.

∀. *quasi-universal* bare plural
e.g. (3) *dogs* | *all dogs* | *most dogs* are intelligent ~ (4) *this kind of animal* is intelligent.

*k*. *whole-kind* bare plural
e.g. (5) *dodos* | *#sm dodos* | *#all dodos* | … are extinct ~ (6) *this kind of bird* is extinct.

**Obs 2:** The predicate determines the reading of its bare plural argument.

$_{\exists}$V Predicates of existential bare plural | *this kind*:
e.g. *be available* (as in (1)–(2)), *be barking*, …

$_{\forall}$V Predicates of quasi-universal bare plural | *this kind*:
e.g. *be intelligent* (as in (3)–(4)), *barks*, …

$_{k}$V Predicates of *whole-kind* bare plurals | *this kind*:
e.g. *be extinct* (as in (5)–(6)), *be common, come in different sizes*, …

- **Obs 3:** *Bare plurals* exhibit different scope behavior than DET NP:

| | bare plural | DET NP |
|---|---|---|
| *wide* scope? | * (always *narrow*) | ✓ (possible)<br>e.g. (7) Jim didn't see *sm* policemen<br>(cf. (8) Jim didn't see *policemen*) |
| *extra-narrow*? | ✓ (possible)<br>(9) a. *Rats* are everywhere.<br>b. There are *rats* everywhere. | * (impossible)<br>(10) a. *#Sm* rats are everywhere.<br>b. #There were *sm* rats everywhere. |

## 2 EVIDENCE FROM ENGLISH TEXTS

*Notation:*

- In (11)–(15), bare plural arguments are highlighted in *italics*, the predicates are underlined**.**
- The predicates are classified as *existential* ($_{\exists}$), *quasi-universal* ($_{\forall}$), or *whole-kind* ($_{k}$) in relation to their *subject* ($_{\exists}$V, $_{\forall}$V, $_{k}$V) and/or *object* (V$_{\exists}$, V$_{\forall}$, V$_{k}$) bare plural argument.

- Mostly *existential* bare plurals (*subjects* in (11), *objects* in (12)); some *whole-kind*

(11) (Ingalls Wilder, L. 1932. *Little House in the Woods*, p. 1)
Once upon a time, sixty years ago, a little girl lived in the Big Woods of Wisconsin, in a little gray house made of$_{\exists}$ *logs*.

The great, dark trees of the Big Woods stood all around the house, and beyond them were$_{\exists}$ *other trees* and beyond them were more trees. …

*Wolves* $_{k}$lived in the Big Woods, and *bears*, and huge *wild cats*. *Muskrats* and *mink* and *otter* $_{k}$lived by the streams. *Foxes* $_{k}$had$_{\exists}$ *dens* in the hills and *deer* $_{k}$roamed everywhere.

(12) (MacLachlan, P. 1985. *Sarah, Plain and Tall*, p. 11)
(A widowed father advertizes for a wife and gets a letter from one Sarah Elisabeth Wheaton.)
Caleb and Papa and I wrote$_{\exists}$ *letters* to Sarah, and before the ice and snow had melted from the fields, we all received$_{\exists}$ *answers.* Mine came first.

Dear Anna,

Yes, I can braid hair and I can make stew and bake bread, though I prefer to build$_k$ *bookshelves* and paint.

My favorite colors are the colors of the sea, blue and gray and green, depending on the weather. My brother William is a fisherman…. He catches$_{k?}$ *flounder* and *sea bass* and *bluefish.* Sometimes he sees$_{\exists ?}$ *whales.* And *birds*, too, of course. I am enclosing a book of$_k$ *sea birds* so you will see what William and I see every day.

Very truly yours,
Sarah Elisabeth Wheaton

- Mostly *quasi-universal* or *whole-kind* bare plurals

(13) (Kalman, B. & A. Bishop, 2002, *The Life Cycle of a Wolf*)

a. In the past, *wolves* $_k$lived in more places than did any other land mammal except$_k$ *humans*. In North America, they lived from the Arctic to Mexico. Today, *wolves* $_k$are still found in many parts of North America, but most live in Canada and Alaska. The wolf populations in the United States and Mexico are much smaller. In fact, *wolves* $_k$are an endangered species in most regions of these countries. (p. 7)

b. *Wolves* $_{\forall}$live in$_{\exists}$ *groups* called *packs*. *Packs* $_{\forall}$are made up of$_{k?}$ *related wolves*, usually *parents and their offspring.* Most packs have six or seven members, but some have more than twenty.
The wolves in a pack live together and work as a team to hunt$_{k?}$ *other animals.* (p. 8)

c. *Wolves*…$_{\forall}$communicate a variety of messages with their faces. Some scientists believe that *wolves* $_{\forall}$use as many as 20 different facial expressions. *Wolves* $_{\forall}$curl their lips, $_{\forall}$bare their teeth, $_{\forall}$narrow their eyes, and even $_{\forall}$stick out their tongues to show their moods. (p. 21)

(14) (O'Dell, S. 1988, *Black Star, Bright Dawn*, p. 4–5)
Hunting is dangerous. Danger lurks everywhere. *Killer whales* $_{\forall}$are thirty feet long, and if a man is hunting in a kayak they can snatch him up, kayak and all…*Polar bears* $_k$are the worst of all$_k$. They $_{\forall}$feed on$_k$ *seals*, and because *hunters* $_{\forall}$always smell of$_k$ *seals*, the bears think they $_{\forall}$are$_{\exists}$ seals and track them down.

- A *fourth* reading: *Role-based*

(15) (From transl. of Lindgren, A. *Ronja Rövardotter* (Ronia, The Robber's Daughter), p. 22)
(Ronia goes to Hell's Gap to practice not being afraid & meets somebody.)
A little way off on the other side of the chasm, someone was sitting, someone about her own size, dangling his legs over Hell's Gap.

Ronia knew that she was not the only child in the world. She was simply the only child in Matt's Fort and Matt's Forest. But Lovis had said that there were plenty of$_k$ *children* in other places, and of two kinds: those who would turn into$_h$ *Matts* when they were big, and those who would turn into$_h$ *Lovises*. Ronia herself would turn into a Lovis, but she knew in her heart that the one who was sitting dangling his legs over Hell's Gap would turn into a Matt.

## 3 CARLSON 1977: THE BASIC STORY

- **Ingredient 1**: *Sorted* Intensional Logic (*Sorted IL*, with sorted types SType)
  i. Entities sorted into *stages* (e.g. Fido_today), *objects* (e.g. Fido), *kinds* (e.g. the dog-kind); objects and kinds jointly constitute a fourth sort: *individuals*.

| Name | SType | **MB** abbr. | Variables |
|---|---|---|---|
| stages | **st**($e$) | $\sigma$ | $x^s, y^s, z^s$ |
| objects | **o**($e$) | $\beta$ | $x^o, y^o, z^o$ |
| kinds | **k**($e$) | $\kappa$ | $x^k, y^k, z^k$ |
| individuals | **in**($e$) | $\delta$ | $x^i, y^i, z^i$ |

  ii. Every stage *realizes* ($R$) some individual, and every object *realizes'* ($R'$) some kind:
  e.g. $R(z^s, fido)$ (stage $z^s$ realizes Fido)
  $R(z^s, dog^k)$ (stage $z^s$ realizes the dog-kind)
  $R'(fido, dog^k)$ (Fido realizes the dog-kind)
  Any stage $z^s$ of any object $y^o$ of any kind $x^k$ is a stage of that kind,
  i.e. $\forall z^s \forall y^o \forall x^k (R(z^s, y^o) \wedge R'(y^o, x^k) \rightarrow R(z^s, x^k))$

- **Ingredient 2**: *Basic meanings* (**MB**: simplified in inessential ways)

| | | English | Sorted IL | SType |
|---|---|---|---|---|
| i. | *stage*-level pred. | bark- | $\lambda z^s[bark^+(z)]$ | $\sigma t$ |
| | | available | $\lambda z^s[available(z)]$ | $\sigma t$ |
| | *object*-level pred. | intelligent | $\lambda y^o[intelligent(y)]$ | $\beta t$ |
| | | four-legged | $\lambda y^o[four.legged(y)]$ | $\beta t$ |
| | *kind*-level pred. | extinct | $\lambda x^k[extinct(x)]$ | $\kappa t$ |
| | | widespread | $\lambda x^k[widespread(x)]$ | $\kappa t$ |
| ii. | aspect | -ing | $\lambda S[S]$ | $(\sigma t)(\sigma t)$ |
| | | ($be_2$) | $\lambda S \lambda y^i[\exists z^s(R(z, y) \wedge S(z)]$ | $(\sigma t)(\delta t)$ |
| iii. | name | Fido | $fido$ | $\beta$ |
| | common noun | dog(s) | $\lambda y^o[dog(y)]$ | $\beta t$ |
| iv. | det | a, sm | $\lambda P \lambda P'[\exists y^i(\check{}Py \wedge \check{}P'y)]$ | $(s\delta t)(s\delta t)t$ |
| | | every, all | $\lambda P \lambda P'[\forall y^i(\check{}Py \rightarrow \check{}P'y)]$ | $(s\delta t)(s\delta t)t$ |
| | | ⋮ | ⋮ | ⋮ |
| v. | tense, neg, modals | PRS | $\lambda p[p]$ | $tt$ |
| | | PST | $\lambda p[\mathbf{H}\, p]$ | $tt$ |
| | | not | $\lambda p[\neg\check{}p]$ | $tt$ |

*Note*: In Sorted IL, as in Montague's IL, $t$-terms are evaluated relative to a model $M$ and a *world-time pair* $\langle w, t \rangle$ ('index'), so for each $t$-term we get a *set of world-time pairs*.

- **Ingredient 3**: Semantic composition
  i. *LF-based* composition (i.e. input ≠ surface form)
     e.g. (1) dogs are barking.
     $LF_1$ [$_S$ PRS [$_{S0}$ [$_T$ [$_{CN}$ dogs]] [$_{VP}$ bark- -ing]]]

  ii. *Quantifier Raising* for [DET NP]
     Montague-style, with indexed & sorted pronouns, $he_n^a$ ($a \in \{\beta, \kappa, \delta\}$), instead of traces

  iii. *Bare Plural Rule* (T4 on p. 149; sample derivation on p. 129)

| e.g. | English | LF syntax | Transl. into 5-sorted Type Logic ($Ty_5$) | |
|---|---|---|---|---|
| | dogs | [$_{CN}$ $dog] | $\lambda y^o[dog\ y]$ | |
| | dogs | [$_T$ $dog], | $\iota x^k \forall y^o \forall w \forall t(dog_{wt}\ y \leftrightarrow R(y, x))$ (**MB**: no MG lift)<br>(the kind $k$ such that for any obj $a$, world $w$, time $t$ $a$ realizes $k$ in $w$ at $t$ iff $a$ is a dog in $w$ at $t$)<br>ABBREVIATIONS:<br>$d$ := $\iota x^k \forall y^o \forall w \forall t(dog_{wt}\ y \leftrightarrow R(y, x))$ **GC**<br>=: KND $dog$ **MB** | |

  iv. Covert habitual-generic aspect:

| | | | |
|---|---|---|---|
| *2nd fragment* | $\varnothing_\sigma$ (hab., gnr.) | $\lambda S \lambda y^i\ \mathbf{G}(S)(y)$ | $(\sigma t)(\delta t)$ |
| *2nd fragment* | $\varnothing_\beta$ (hab., gnr.) | $\lambda P \lambda x^k\ \mathbf{G'}(P)(x)$ | $(\beta t)(\kappa t)$ |

REFERENCE:
Carlson, G. 1977. *Reference to Kinds in English*. Ph. D. thesis, UMass at Amherst.
(http://semanticsarchive.net)

# FROM BARE PLURALS TO SORTED LOGIC

## 1 CARLSON 1977: 1ST FRAGMENT

- Syntax (p. 135–141, key rules ***bold***) — Translation into Sorted IL (p. 145–151)

| | | |
|---|---|---|
| **S1** | ***basic*** category | p. 146 & **T1** |
| **S2** | ***pl-***noun: $[A]_{CN} \rightarrow_{F1} \$[A]_{CN}$ | **T2**: no semantic effect |
| **S3** | ***det*** + ***noun*** | **T3**: MG function application |
| **S4** | ***bare pl*** term: $\$[A]_{CN} \rightarrow_{F3} [\$A]_{T}$ | **T4**: property → corresponding kind |
| S5 | relative clause rule | |
| S6 | CN/CN adjectives | |
| **S7** | ***subject*** + ***predicate*** (add $[be_1]_V$ if no V) | **T7**: MG function application |
| S8 | verb + object | |
| S9 | verb + *that*-clause | |
| S10 | verb + *to*-infinitive | |
| S11 | VP adverb (e.g. *slowly*) | |
| S12 | *to*-infinitive | |
| S13 | predicate nominal (*be a dog/dogs*) | |
| **S14** | tense, modals, ***negation***, S-adverbs | **T14**: MG function application |
| S15 | $see_2$ (as in *see them drunk*) | |
| S16 | progressive *-ing* | |
| **S17** | VP modifiers, incl. | |
| | $\boldsymbol{be_2}$ (as in *be available, be barking*) | |
| | $be_3$ (as in *he's being polite*) | |
| S18 | preposition + object | |
| S19 | $S_1$ *and* $S_2$ | |
| S20 | $VP_1$ *and* $VP_2$ | |
| S21 | $NP_1$ *and* $NP_2$ | |
| S22 | $S_1$ *or* $S_2$ | |
| S23 | $VP_1$ *or* $VP_2$ | |
| S24 | $NP_1$ *or* $NP_2$ | |
| **S25** | **quantifying-into**-S (= t) | **T25**: as in PTQ |
| S26 | quantifying-into-VP (= IV) | |
| S27 | *there*-insertion | |

- Sem. objects — Sorted IL (p. 141–145) — 5-Sorted Type Logic ($Ty_5$) — Remarks

| | | | |
|---|---|---|---|
| stages | $st(e) =: \sigma$ | $\sigma$ | |
| objects | $o(e) =: \beta$ | $\beta$ | |
| kinds | $k(e) =: \kappa$ | $\kappa$ | |
| individuals | $in(e) =: \delta$ | $\delta$ | $D_\delta = D_\beta \cup D_\kappa$ |
| entities | $e$ | $e$ | $D_e = D_\sigma \cup D_\delta$ |
| worlds | 1st coordinate of $s$ | $\omega$ | |
| times | 2nd coordinate of $s$ | $\tau$ | |
| intension | $\hat{}A$ | $\lambda w \lambda t[A]$ | |
| extension | $\check{}A$ | $A(w)(t)$ =: $A_{wt}$ | |

1 KIND-LEVEL PREDICATE → *k*-BARE PL (**Obs 1, 2**)

(1) Dogs are common.

$[\text{do}_{+\text{pres}}]_V$ — S1: t/t: **5**

$[\text{dog}]_N$ — S1: CN (= t//e): **2**
— S2: CN ($[\$[\text{dog}]_N]_{CN}$): **2**
— S4: T (= t/IV): **3**
— S7: t ($[[\$\text{dog}]_T$ to $[\text{be}_1]_V$ $[\text{common}]_{IV}]_t$): **4**

$[\text{common}]_{Adj}$ — S1: IV (= t/e): **1**

— S14: t ($[[\$\text{dog}]_T$ $[\text{do}_{+\text{pres}}]_V$ $[\text{be}_1]_V$ $[\text{common}]_{IV}]_t$): **6**

| | *Sorted IL-translation*<br>*Ty₅-translation* | *SType*<br>*Ty₅-type* | *Fragment 1 def.'s* |
|---|---|---|---|
| **1** | common′ | $\kappa t$ | p. 146, (4) |
| | $\lambda x^k[common_{wt}(x)]$ | $\kappa t$ | |
| **2** | dog′ | $\delta t$ | p. 146, (1) |
| | $\lambda z^i[dog_{wt}(z)]$ | $\delta t$ | |
| **3** | $\lambda P[\check{}P(\iota x^k.\forall z^o\Box(R(z, x) \leftrightarrow \text{dog}'(z)))]$ | $(s\delta t)t$ | T4, p. 129 = T6, p. 261 |
| | $=: \lambda P^{\wedge}[\check{}P(d)]$ | | (**2 typos** in T4, p. 149) |
| | $\lambda P[P_{wt}(\iota x^k.\forall z^o\forall w\forall t(R(z, x) \leftrightarrow dog_{wt}(z)))]$ | $(\omega\tau\delta t)t$ | |
| | $=: \lambda P^{\wedge}[P_{wt}(\text{KND } dog)]$ | | |
| **4** | $\lambda P[\check{}P(d)](\hat{}\text{common}')$ | $t$ | T7 |
| | $= \check{}(\hat{}\text{common}')(d)$ | | $\lambda$-cnv. |
| | $= \text{common}'(d)$ | | df. Sorted IL |
| | $\lambda P[P_{wt}(\text{KND } dog)](\lambda w\lambda t\lambda x^k[common_{wt}(x)])$ | $t$ | |
| | $= \lambda x^k[common_{wt}\, x](\text{KND } dog)$ | | $\lambda$-cnv |
| | $= common_{wt}(\text{KND } dog)$ | | $\lambda$-cnv |
| **5** | $\lambda p[\textbf{Pres}(\check{}p)]$ | $(st)t$ | T1.e |
| | $= \lambda p[\check{}p]$ | | p. 150, MP9 |
| | $\lambda p[p_{wt}]$ | $(\omega\tau t)t$ | |
| **6** | $\lambda p[\check{}p](\hat{}\text{common}'(d))$ | $t$ | T14 |
| | $= \check{}[\hat{}\text{common}'(d)]$ | | $\lambda$-cnv. |
| | $= \text{common}'(d)$ | | df. Sorted IL |
| | $\lambda p[p_{wt}](\lambda w\lambda t[common_{wt}(\text{KND } dog)])$ | $t$ | |
| | $= common_{wt}(\text{KND } dog)$ | | $\lambda$-cnv. |

i.e. In *w* (by default: *speech world*) at *t* (by default: *speech time*), the dog-kind is common.

## 2 STAGE-LEVEL PREDICATE → ∃-BARE PL (**Obs 1, 2**)

(2a) Dogs are available.

| $[do_{+pres}]_V$ | $[\$[dog]_N]_{CN}$ | $[be_2]_V$ | $[available]_{Adj}$ |
|---|---|---|---|
| S1 | S1,S2 | S1 | S1 |
| t/t: **7** | CN: **4** | IV///IV: **2** | IV: **1** |
| | S4 | S17 | |
| | T: **5** | IV: **3** | |
| | S7 | | |
| | t ($[[\$dog]_T$ to $[be_2$ available$]_{IV}]_t$): **6** | | |
| S14 | | | |
| t ($[[\$dog]_T$ $[do_{+pres}]_V$ $[be_2$ available$]_{IV}]_t$): **8** | | | |

| | *Sorted IL-translation*<br>*$Ty_5$-translation* | *SType*<br>*$Ty_5$-type* | *Fragment 1 def.'s* |
|---|---|---|---|
| **1** | available′<br>$\lambda z^s[available_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | p. 146, (2) |
| **2** | $\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge \check{}S(z))]$<br>$\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge S_{wt}(z)]$ | $(s\sigma t)\delta t$<br>$(\omega\tau\sigma t)\delta t$ | p. 147, T1.d |
| **3** | $\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge \check{}S(z))](\hat{}$available′)<br>= $\lambda x^i[\exists z^s(R(z, x) \wedge$ available′$(z))]$ | <br>$\delta t$ | T17 |
| | $\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge S_{wt}(z))](\lambda w\lambda t\lambda z^s[available_{wt}(z)])$<br>= $\lambda x^i[\exists z^s(R(z, x) \wedge available_{wt}(z))]$ | <br>$\delta t$ | |
| **4** | dog′<br>$\lambda z^i[dog_{wt}(z)]$ | $\delta t$<br>$\delta t$ | p. 146, (1) |
| **5** | $\lambda P[\check{}P(\iota x^k.\forall z^o\Box(R(z, x) \leftrightarrow$ dog′$(z)))]$<br>=: $\lambda P[\check{}P(d)]$ | $(s\delta t)t$ | T4, p. 129 = T6, p. 261<br>(**2 typos** in T4, p. 149) |
| | $\lambda P[P_{wt}(\iota x^k.\forall z^o\forall w\forall t(R(z, x) \leftrightarrow dog_{wt}(z)))]$<br>=: $\lambda P[P_{wt}($KND $dog)$ | $(\omega\tau\delta t)t$ | |
| **6** | $\exists z^s(R(z, d) \wedge$ available′$(z))$<br>$\exists z^s(R(z,$ KND $dog) \wedge available_{wt}(z))$ | $t$<br>$t$ | T7, df. Sorted IL |
| **7** | $\lambda p[\check{}p]$<br>$\lambda p[p_{wt}]$ | $(st)t$<br>$(\omega\tau t)t$ | T1.e, MP9 |
| **8** | $\exists z^s(R(z, d) \wedge$ available′$(z))$<br>\|= $\exists y^o($dog′$(y) \wedge \exists z^s[R(z, y) \wedge$ available′$(z)])$<br>= $\exists y^o($dog′$(y) \wedge \exists z^s[R(z, y) \wedge$ available′$(z)])$ | $t$ | T14, df. Sorted IL<br>p. 150, MP7<br>df. *d* above |
| | $\exists z^s(R(z,$ KND $dog) \wedge available_{wt}(z))$<br>\|= $\exists y^o(dog_{wt}\, y \wedge \exists z^s(R(z, y) \wedge available_{wt}(y)))$ | $t$ | |

i.e. In (the *speech world*) *w* at (the *speech time*) *t*, there is an available stage of the dog-kind
|= In (the *speech world*) *w* at (the *speech time*) *t*, there is an available stage of some dog.

(2b) Some dogs are available. ~ (2a) (**Obs 1**: ∃)

| $[do_{+pres}]_V$ | $[some]_Q$ | $[dog]_N$ | $[be_2]_V$ | $[available]_{Adj}$ |
|---|---|---|---|---|
| S1 | S1 | S1 | S1 | S1 |
| t/t: **7** | T/CN: **4a** | CN: **4b** | IV///IV: **2** | IV: **1** |
| | S3 | | S17 | |
| | T: **5** | | IV: **3** | |
| | S7 | | | |
| | t ([[some dog]$_T$ to [be$_2$ available]$_{IV}$]$_t$): **6** | | | |
| S14 | | | | |
| t ([[some dog]$_T$ [do$_{+pres}$]$_V$ [be$_2$ available]$_{IV}$]): **8** | | | | |

| | *Sorted IL-translation*<br>*Ty$_5$-translation* | *SType*<br>*Ty$_5$-type* | *Fragment 1 def.'s* |
|---|---|---|---|
| **1** | available′<br>$\lambda z^s[available_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | p. 146, (2) |
| **2** | $\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge \check{}S(z))]$<br>$\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge S_{wt}(z)]$ | $(s\sigma t)\delta t$<br>$(\omega\tau\sigma t)\delta t$ | p. 147, T1.d |
| **3** | $\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge \check{}S(z))](\hat{}\text{available}')$<br>= $\lambda x^i[\exists z^s(R(z, x) \wedge \text{available}'(z))]$ | <br>$\delta t$ | T17 |
| | $\lambda S\lambda x^i[\exists z^s(R(z, x) \wedge S_{wt}(z))](\lambda w\lambda t\lambda z^s[available_{wt}(z)])$<br>= $\lambda x^i[\exists z^s(R(z, x) \wedge available_{wt}(z))]$ | <br>$\delta t$ | |
| **4a** | $\lambda P'\lambda P[\exists y^o(\check{}P'(y) \wedge \check{}P(y))]$<br>$\lambda P'\lambda P[\exists y^o(P'_{wt}(y) \wedge P_{wt}(y))]$ | $(s\delta t)(s\delta t)t$<br>$(\omega\tau\delta t)(\omega\tau\delta t)t$ | T1.c |
| **4b** | dog′<br>$\lambda z^i[dog_{wt}(z)]$ | $\delta t$<br>$\delta t$ | p. 146, (1) |
| **5** | $\lambda P[\exists y^o(\text{dog}'(y) \wedge \check{}P(y))]$<br>$\lambda P[\exists y^o(dog_{wt}(y) \wedge P_{wt}(y))]$ | $(s\delta t)t$<br>$(\omega\tau\delta t)t$ | T3 |
| **6** | $\exists y^o(\text{dog}'(y) \wedge \exists z^s(R(z, y) \wedge \text{available}'(z)))$<br>$\exists y^o(dog_{wt}(y) \wedge \exists z^s(R(z, y) \wedge available_{wt}(z)))$ | $t$<br>$t$ | T7, df. Sorted IL |
| **7** | $\lambda p[\check{}p]$<br>$\lambda p[p_{wt}]$ | $(st)t$<br>$(\omega\tau t)t$ | T1.e, MP9 |
| **8** | $\exists y^o(\text{dog}'(y) \wedge \exists z^s(R(z, y) \wedge \text{available}'(z)))$<br>$\exists y^o(dog_{wt}\, y \wedge \exists z^s(R(z, y) \wedge available_{wt}(z)))$ | $t$<br>$t$ | T14, df. Sorted IL |

i.e. In (the *speech world*) *w* at (the *speech time*) *t*, there is an available stage of some dog

## 3 EXTRA-NARROW SCOPE

(3a) Dogs were everywhere. **Obs 3**: ✓ extra-narrow scope

[do$_{-pres}$]$_V$ [$[dog]$_N]$_{CN} [everywhere]$_{PP}$
——— B9 ——— B1, S2 ——— B3
t/t: **5** CN: **2** IV: **1**
——— S4
T: **3**
——— S7
t ([[$dog]$_T$ to [be$_1$]$_V$ [everywhere]$_{IV}$]$_t$): **4**
——— S14
t ([[$dog]$_T$ [do$_{-pres}$]$_V$ [be$_1$]$_V$ [everywhere]$_{IV}$]$_t$): **6**

| | *Sorted IL-translation*<br>*Ty$_5$-translation* | *SType*<br>*Ty$_5$-type* | *Fragment 1 def.'s* |
|---|---|---|---|
| **1** | $\lambda x^i[\forall y^i(\text{place}'(y) \rightarrow \exists z^s(R(z, x) \wedge At(z, y)))]$ | $\delta t$ | p. 90, (58) |
| | $\lambda x^i[\forall y^i(place_{wt}\, y \rightarrow \exists z^s(R(z, x) \wedge at_{wt}(z, y)))]$ | $\delta t$ | |
| **2** | $\text{dog}'$ | $\delta t$ | p. 146, (1) |
| | $\lambda z^i[dog_{wt}(z)]$ | $\delta t$ | |
| **3** | $\lambda P[\check{}P(\iota x^k \forall z^o \Box(R(z, x) \leftrightarrow \text{dog}'(z)))]$ | $(s\delta t)t$ | T4, p. 129 = T6, p. 261 |
| | $=: \lambda P[\check{}P(d)]$ | | (**2 typos** in T4, p. 149) |
| | $\lambda P[P_{wt}(\iota x^k \forall z^o \forall w \forall t(R(z, x) \leftrightarrow dog_{wt}(z)))]$ | $(\omega\tau\delta t)t$ | |
| | $=: \lambda P[P_{wt}(\text{KND}\ dog)]$ | | |
| **4** | $\forall y^i(\text{place}'(y) \rightarrow \exists z^s[R(z, d) \wedge At(z, y)])$ | $t$ | T7, def. Sorted IL |
| | $\forall y^i(place_{wt}(y) \rightarrow \exists z^s(R(z, \text{KND}\ dog) \wedge at_{wt}(z, y)))$ | $t$ | |
| **5** | $\lambda p[\mathbf{H}(\check{}p)]$ | $(st)t$ | T1.e, MP9 |
| | $\lambda p[\exists t'(t' < t \wedge p_{wt'})]$ | $(\omega\tau t)t$ | |
| **6** | $\mathbf{H}\ \forall y^i(\text{place}'(y) \rightarrow \exists z^s(R(z, d) \wedge At(z, y)))$ | $t$ | T14, def. Sorted IL |
| | $\models\ \mathbf{H}\ \forall y^i(\text{place}'(y) \rightarrow \exists x^o(R(x, d) \wedge \exists z^s(R(z, x) \wedge At(z, y))))$ | | p. 150, MP7 |
| | $=\ \mathbf{H}\ \forall y^i(\text{place}'(y) \rightarrow \exists x^o(\text{dog}'(x) \wedge \exists z^s(R(z, x) \wedge At(z, y))))$ | | def. *d* above |
| | $\exists t'(t' < t \wedge$ $\forall y^i(place_{wt}(y) \rightarrow \exists z^s(R(z, \text{KND}\ dog) \wedge at_{wt}(z, y))))$ | $t$ | |
| | $\models\ \exists t'(t' < t \wedge$ $\forall y^i(place_{wt}(y) \rightarrow \exists x^o(dog_{wt}(x) \wedge \exists z^s(R(z, x) \wedge at_{wt}(z, y)))))$ | | |

i.e. In (the *speech world*) *w* at some time *t′* in the past of (the *speech time*) *t*, in every place, there was some stage of the dog-kind

|= In (the *speech world*) *w* at some time *t′* in the past of (the *speech time*) *t*, in every place, there was some dog.

(3b) # Some dogs were everywhere. **Obs 3**: * extra-narrow scope

| $[\text{do}_{\text{–pres}}]_V$ | $[\text{some}]_Q$ | $[\text{dog}]_N$ | $[\text{everywhere}]_{PP}$ |
|---|---|---|---|
| ——— S1 | ——— S1 | ——— S1 | ——— S1 |
| t/t: **5** | T/CN: **2a** | CN: **2b** | IV: **1** |
| | ——— S3 | | |
| | T: **3** | | |
| | ——— S7 | | |
| | t ($[[\text{some dog}]_T$ to $[\text{be}_1]_V$ $[\text{everywhere}]_{IV}]_t$): **4** | | |
| ——— S14 | | | |
| t ($[[\text{some dog}]_T$ $[\text{do}_{\text{–pres}}]_V$ $[\text{be}_1]_V$ $[\text{everywhere}]_{IV}]_t$): **6** | | | |

| | *Sorted IL-translation*<br>*$Ty_5$-translation* | *SType*<br>*$Ty_5$-type* | *Fragment 1 def.'s* |
|---|---|---|---|
| **1** | $\lambda x^i\, \forall y^i(\text{place}'(y) \rightarrow \exists z^s[R(z,x) \wedge At(z,y)])$<br>$\lambda x^i\, \forall y^i(place_{wt}\, y \rightarrow \exists z^s[R(z,x) \wedge at_{wt}(z,y)])$ | $\delta t$<br>$\delta t$ | p. 90, (58) |
| **2a** | $\lambda P'\lambda P[\exists y^o(\check{}P'(y) \wedge \check{}P(y))]$<br>$\lambda P'\lambda P[\exists y^o(P'_{wt}(y) \wedge P_{wt}(y))]$ | $(s\delta t)(s\delta t)t$<br>$(\omega\tau\delta t)(\omega\tau\delta t)t$ | T1.c |
| **2b** | $\text{dog}'$<br>$\lambda z^j[dog_{wt}(z)]$ | $\delta t$<br>$\delta t$ | p. 146, (1) |
| **3** | $\lambda P[\exists y^o(\text{dog}'(y) \wedge \check{}P(y))]$<br>$\lambda P[\exists y^o(dog_{wt}(y) \wedge P_{wt}(y))]$ | $(s\delta t)t$<br>$(\omega\tau\delta t)t$ | T3 |
| **4** | $\exists x^o(\text{dog}'(x)$<br>$\wedge \forall y^i(\text{place}'(y) \rightarrow \exists z^s[R(z,x) \wedge At(z,y)]))$<br>$\exists x^o(dog_{wt}\, x$<br>$\wedge \forall y^i(place_{wt}\, y \rightarrow \exists z^s[R(z,x) \wedge at_{wt}(z,y)]))$ | $t$<br>$t$ | T7, df. Sorted IL |
| **5** | $\lambda p[\mathbf{H}(\check{}p)]$<br>$\lambda p[\exists t'(t' < t \wedge p(w)(t'))]$ | $(st)t$ | T1.e, MP9<br>$(\omega\tau t)t$ |
| **6** | $\mathbf{H}\, \exists x^o(\text{dog}'(x)$<br>$\wedge \forall y^i(\text{place}'(y) \rightarrow \exists z^s(R(z,x) \wedge At(z,y))))$<br>$\exists t' \exists x^o(t' < t \wedge dog_{wt'}\, x$<br>$\wedge \forall y^i(place_{wt'}\, y \rightarrow \exists z^s(R(z,x) \wedge at_{wt}(z,y))))$ | $t$<br>$t$ | T14, df. Sorted IL |

i.e. In (the *speech world*) *w* at some time *t'* in the past of (the *speech time*) *t*, there was some dog (*x*) s.t. in every place, there was some stage of that dog.

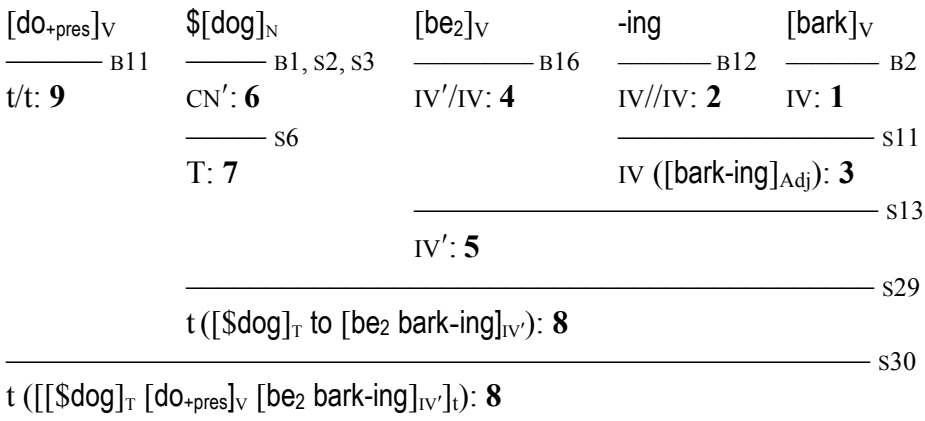
# STAGE- VERSUS OBJECT-LEVEL PREDICATES

## 1 CARLSON 1977: FRAGMENT 2

| | ***Fragment 2 syntax*** (p. 249–257, key rules in bold) | *Fragment 1 syntax* (p. 135–141) |
|---|---|---|
| **$B_a$** | **basic** phrases (i.e. lexical items) | ≥ $B_a$ |
| S1 | a basic *a*-phrase is an *a*-phrase | S1 |
| **S2** | ***pl*-noun**, **T2**: identity | **S2** |
| S3 | CN′ (NP) → CN, **T3**: identity | |
| **S4** | **det + noun** | **S3** |
| S5 | relative clause rule | S5 |
| **S6** | **bare pl arg**., **T6**: $\delta t$ to $\kappa$-correlate | **S4** |
| S7 | CN/CN adjectives, the noun *kind* | ≥ S6 |
| S8 | predicate nominal (*be a dog/dogs*) | S13 |
| S9 | IV′ → IV, T9: no sem. effect | |
| S10 | VP adverb (e.g. *slowly*) | S11 |
| **S11** | **progressive *-ing*** | S16 |
| S12 | *be* (as in ***is*** *being polite*) | ≤ S7 *subject + predicate* |
| | $be_3$ (as in ***be****-ing polite*) | ≤ **S17** VP modifiers |
| **S13** | ***be*$_2$** (as in ***be*** *available,* ***be*** *barking*) | ≤ **S17** |
| S14 | adverbs of quantification | |
| S15 | verb + *that*-clause | S9 |
| S16 | $see_2$ (as in *see them drunk*) | S15 |
| S17 | verb + object | S8 |
| S18 | *to*-infinitive | S12 |
| S19 | verb + *to*-infinitive | S10 |
| S20 | preposition + object | S18 |
| **S21** | **IV′ → IV otf [V…], T21**: $\sigma t$ to $\delta t$ via **G** | |
| S22 | IV′ → IV, T22; $\beta t$ to $\kappa t$ via G′ | |
| **S23** | **IV′ → IV otf [V…], T23**: $\sigma t$ to $\delta t$ via [**be$_2$**]′ | |
| S24 | derived VP (e.g. *defend himself*) | |
| S25 | *such* np | |
| S26 | indefinite sg generic (*a dog* is a mammal) | |
| S27 | *such-as* relatives | |
| S28 | *such-as* nominals | |
| **S29** | **subject + predicate** | **≤S7** |
| **S30** | **tense**, modals, negation, S-adverbs | **S14** |
| S31 | $S_1$ *and* $S_2$ | S19 |
| S32 | $VP_1$ *and* $VP_2$ | S20 |
| S33 | $NP_1$ *and* $NP_2$ | S21 |
| S34 | $S_1$ *or* $S_2$ | S22 |
| S35 | $VP_1$ *or* $VP_2$ | S23 |
| S36 | $NP_1$ *or* $NP_2$ | |
| S37 | quantifying-into-S (= t) | S25 |
| S38 | passive rule | |

## 2 PROGRESSIVE VERB AS STAGE-LEVEL PREDICATE

(1) Dogs are barking




| | *Sorted IL-translation*<br>*Ty5-translation* | *SType*<br>*Ty5-type* | *Fragment 1&2 def.'s* |
|---|---|---|---|
| **1** | $\lambda z^s[\text{bark}^+(z)]$<br>$\lambda z^s[bark_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | p. 257, (2) |
| **2** | $\lambda S \lambda z^s[\text{prg'}(S)(z)]$<br>$\lambda S \lambda z^s[prg_{wr}(S)(z)]$ | $(s\sigma t)\sigma t$<br>$(\omega\tau\sigma t)\sigma t$ | p. 258, (12) |
| **3** | $\lambda z^s[\text{prg}'(\hat{}\text{bark}^+)(z)]$<br>$\lambda z^s[prg_{wr}(bark)(z)]$ | $\sigma t$<br>$\sigma t$ | T11 |
| **4** | $\lambda S \lambda x^i[\exists z^s(R(z, x) \wedge \check{}S(z))]$<br>$\lambda S \lambda x^i[\exists z^s(R(z, x) \wedge S_{wt}(z))$ | $(s\sigma t)\delta t$<br>$(\omega\tau\sigma t)\delta t$ | p. 260, T1.h |
| **5** | $\lambda x^i[\exists z^s(R(z, x) \wedge \text{prg}'(\hat{}\text{bark}^+)(z))]$<br>$\lambda x^i[\exists z^s(R(z, x) \wedge prg_{wt}(bark)(z))]$ | $\delta t$<br>$\delta t$ | T13 |
| **6** | $\lambda x^i[\text{dog}'(x)]$<br>$\lambda x^i[dog_{wt}(x)]$ | $\delta t$<br>$\delta t$ | |
| **7** | $\lambda P[\check{}P(\iota x^k.\forall y^o\Box(R(y, x) \leftrightarrow \text{dog}'(y))]$<br>$=: \lambda P[\check{}P(d)]$ | $(s\delta t)t$ | T6, p. 261 **NB: *correct*** |
| | $\lambda P[P_{wt}(\iota x^k.\forall y^o \forall w \forall t(R(y, x) \leftrightarrow dog_{wt}(y)))]$<br>$=: \lambda P[P_{wt}(\text{KND } dog)]$ | $(\omega\tau\delta t)t$ | |
| **8** | $\exists z^s(R(z, d) \wedge \text{prg}'(\hat{}\text{bark}^+)(z))$<br>$\models \exists y^o(R'(y, d) \wedge \exists z^s[R(z, y) \wedge \text{prg}'(\hat{}\text{bark}^+)(z)])$<br>$= \exists y^o(\text{dog}'(y) \wedge \exists z^s[R(z, y) \wedge \text{prg}'(\hat{}\text{bark}^+)(z)])$ | $t$ | T30, def. Sorted IL<br>p. 267, **MP7**<br>def. *d* above |
| | $\exists z^s(R(z, \text{KND } dog) \wedge prg_{wt}(bark)(z))$<br>$\models \exists y^o(dog_{wt}(y) \wedge \exists z^s(R(z, y) \wedge prg_{wt}(bark)(y)))$ | $t$ | |

i.e. In (the *speech world*) *w* at (the *speech time*) *t*, there is a barking stage of the dog-kind.
**Entails**: In (the *speech world*) *w* at (the *speech time*) *t*, there is a barking stage of sm dog.

## 3 HABITUAL VERB AS OBJECT-LEVEL PREDICATE

(2) Dogs bark. ***intuition:***

***rdg* 1** $[\text{do}_{+\text{pres}}]_V$ — B11 → t/t: **6**; $\$[\text{dog}]_N$ — B1, S2, S3 → CN′: **3** — S6 → T: **4**; $[\text{bark}]_V$ — B2 → IV: **1** — **S21** → IV′: **2**; S29 → t ($[\$\text{dog}]_T$ to $[\text{bark}]_{IV'}$): **5**; S30 → t ($[[\$\text{dog}]_T$ $[\text{do}_{+\text{pres}}]_V$ $[\text{bark}]_{IV'}]_t$): **5**

**GC**: ✓, **MB**: too weak?

| | *Sorted IL-translation*<br>*Ty₅-translation* | *SType*<br>*Ty₅-type* | *Frgm. 1&2 dfs* |
|---|---|---|---|
| **1** | $\lambda z^s[\text{bark}^+(z)]$<br>$\lambda z^s[bark_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | p. 257, (2) |
| **2** | $\lambda x^i[\mathbf{G}(\hat{}\text{bark}^+)(x)]$<br>$\lambda x^i[\boldsymbol{G}_{wt}(bark)(x)]$ | $\delta t$<br>$\delta t$ | **T21** |
| **4** | $\lambda P[\check{}P(\iota x^k[\forall y^o\Box(R'(y, x) \leftrightarrow \text{dog}'(y))])$<br>$=: \lambda P[\check{}P(d)]$ | $(s\delta t)t$ | T6, p. 261 |
| | $\lambda P[P_{wt}(\iota x^k \forall y^o \forall w \forall t(R'(y, x) \leftrightarrow dog_{wt}(y)))$<br>$=: \lambda P[P_{wt}(\text{KND } dog)]$ | $(\omega\tau\delta t)t$ | |
| **5** | $\mathbf{G}(\hat{}\text{bark}^+)(d)$<br>$\models$ **H** $\exists z^s R'(z, d) \rightarrow$ **H** $\exists z^s(R'(z, d) \wedge \text{bark}'(z))$<br>$=$ **H** $\exists y^o \exists z^s(\text{dog}'(y) \wedge R(z, y) \wedge \text{bark}'(z))$ | $t$ | T30, Sorted IL<br>**MP9**<br>**H** $\exists y^o R'(y, d)$ |
| | $\boldsymbol{G}_{wt}(bark)(\text{KND } dog)$<br>$\models \exists t'(t' < t \wedge \exists y^o \exists z^s(dog_{wt}(y) \wedge R(z, y) \wedge bark_{wt}(z)))$ | $t$ | |

i.e. In (the *speech world*) *w* at (the *speech time*) *t* the dog-kind is '***generally'*** (**G**) realized by barking stages of dogs.
**Entails**: If in (the *speech world*) *w* before (the *speech time*) *t*, there is a dog, then in *w* before *t*, there is a barking stage of some dog.

(3) [*Most* dogs] bark. ***intuition***: (2) ~ (3)

According to Carlson, (2) intuitively amounts to (3) because of the <u>combination</u> of **G** with $bark^+$. In general, **G** cannot entail anything stronger than **MP9**, because of examples like (4) (= **GC** (12b, g) on p. 40)

(4) a. Alligators *grow to attain a length of somewhere between fifteen and twenty feet.*
[**GC**: Most perish as infants.]
b. Mosquitoes *carry the paramecium that causes yellow fever.*
[**GC**: Fortunately, most do not.]

***rdg* 2** $[do_{+pres}]_V$ $\$[dog]_N$ $[bark]_V$ **GC**: ✓ , **You: ___**

———— B11 ———— B1, S2, S3 ———— B2

t/t: **6** CN′: **3** IV: **1**

———— S6 ———— **S23**

T: **4** IV′: **2′**

———————————— S29

t ($[\$dog]_T$ to $[bark]_{IV'}$): **5**

———————————————————— S30

t ($[[\$dog]_T$ $[do_{+pres}]_V$ $[bark]_{IV'}]_t$): **5**

**1** $\lambda z^s[\text{bark}^+(z)]$ $\sigma t$ p. 257, (2)

$\lambda z^s[bark_{wt}(z)]$ $\sigma t$

⋮

## 4 Stage- and Object-Level Adjectives

(5) Dogs are *available*.

$[do_{+pres}]_V$ $\$[dog]_N$ $[be_2]_V$ $[available]_{Adj}$

———— B11 ———— B1, S2, S3 ———— B16 ———— B2

t/t: **7** CN′: **4** IV′/IV: **2** IV: **1**

———— S6 ———————————— S13

T: **5** IV′: **3**

———————————————————— S29

t ($[\$dog]_T$ to $[[be_2]_V$ available$]_{V'}$): **6**

———————————————————————— S30

t ($[[\$dog]_T$ $[do_{+pres}]_V$ $[be_2$ available$]_{IV'}]_t$): **6**

**1** $\lambda z^s[\text{available}'(z^s)]$ $\sigma t$ p. 257, (2)

$\lambda z^s[available_{wt}(z)]$ $\sigma t$

⋮

(6) Dogs are *intelligent*.

$[do_{+pres}]_V$ $\$[dog]_N$ $[intelligent]_{Adj}$

———— B11 ———— B1, S2, S3 ———— B1, S2

t/t: **6** CN′: **3** IV: **1**

———— S6 ———— S22

T: **4** IV′: **2**

———————————— S29

t ($[\$dog]_T$ to $[be_1$ intelligent$]_{IV'}$): **5**

———————————————————— S30

t ($[[\$dog]_T$ $[do_{+pres}]_V$ $[be_1$ intelligent$]_{IV'}$): **5**

**1** $\lambda y^o[\text{intelligent}'(y)]$ $\beta t$ p. 257, (1)

$\lambda y^o[intelligent_{wt}(y)]$ $\beta t$

⋮

## APPENDIX 1: PROBLEM WITH SIMPLE PRESENT

(2) Dogs *bark*.

***intuition:***

**GC**: ✓ , **MB**: *

***rdg 2***

$[do_{+pres}]_V$ — B11 → t/t: **6**

$\$[dog]_N$ — B1, S2, S3 → CN′: **3** — S6 → T: **4**

$[bark]_V$ — B2 → IV: **1** — **S23** → IV′: **2′**

S29 → t ($[\$dog]_T$ to $[bark]_{IV'}$): **5**

S30 → t ($[[\$dog]_T\ [do_{+pres}]_V\ [bark]_{IV'}]_t$): **5**

| | *Sorted IL-translation*<br>*Ty₅-translation* | *SType*<br>*Ty₅-type* | *Fragment 1&2 defs* |
|---|---|---|---|
| **1** | $\lambda z^s[\text{bark}^+(z)]$<br>$\lambda z^s[bark_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | p. 257, (2) |
| **2′** | $\lambda x^i[\exists z^s(R(z, x) \wedge \text{bark}^+(z))]$<br>$\lambda x^i[\exists z^s(R(z, x) \wedge bark_{wt}(z))]$ | $\delta t$<br>$\delta t$ | **T23** |
| **3** | $\lambda x^i[\text{dog}'(x)]$<br>$\lambda x^i[dog_{wt}(x)]$ | $\delta t$<br>$\delta t$ | |
| **4** | $\lambda P[\check{}P(\iota x^k.\forall y^o\Box(R'(y, x) \leftrightarrow \text{dog}'(y)))]$<br>$=: \lambda P[\check{}P(d)]$ | $(s\delta t)t$ | T6, p. 261 |
| | $\lambda P[P_{wt}(\iota x^k \forall y^o \forall w \forall t(R'(y, x) \leftrightarrow dog_{wt'}\, y))$<br>$=: \lambda P[P_{wt}(\text{KND}\ dog)]$ | $(\omega\tau\delta t)t$ | |
| **5** | $\exists z^s[R(z, d) \wedge \text{bark}^+(z)]$<br>$\exists z^s[R(z, \text{KND}\ dog) \wedge bark_{wt}(z)]$ | $t$<br>$t$ | T30, Sorted IL |

That is, (2) is supposed to have a reading on which it is equivalent to the progressive

(1) Dogs are barking.

I doubt that native speakers of English (non-linguists, non-philosophers) would agree that (2) has such a reading. If it does not, then this prediction is a problem for Carlson's (1977) Fragment 2 theory.

## APPENDIX 2: STAGE- & OBJECT-LEVEL ADJECTIVES

(5) Dogs are *available*.

| $[do_{+pres}]_V$ | $\$[dog]_N$ | $[be_2]_V$ | $[available]_{Adj}$ |
|---|---|---|---|
| ——— B11 | ——— B1, S2, S3 | ——— B16 | ——— B2 |
| t/t: **7** | CN′: **4** | IV′/IV: **2** | IV: **1** |
| | ——— S6 | ——— S13 | |
| | T: **5** | IV′: **3** | |
| | ——— S29 | | |
| | t ($[[\$dog]_T$ to $[[be_2]_V$ available$]_{IV'}]_t$): **6** | | |
| ——— S30 | | | |
| t ($[[\$dog]_T$ $[do_{+pres}]_V$ $[be_2$ available$]_{IV'}]$): **6** | | | |

| | *Sorted IL-translation*<br>*$Ty_5$-translation* | *SType*<br>*$Ty_5$-type* | *Fragment 1&2 defs* |
|---|---|---|---|
| **1** | $\lambda z^s$[available′($z^s$)]<br>$\lambda z^s[available_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | p. 257, (2) |
| **2** | $\lambda S \lambda x^i[\exists z^s(R(z, x) \wedge \check{}S(z))]$<br>$\lambda S \lambda x^i[\exists z^s(R(z, x) \wedge S_{wt}(z))$ | $(s\sigma t)\delta t$<br>$(\omega\tau\sigma t)\delta t$ | p. 260, T1.h |
| **3** | $\lambda S \lambda x^i[\exists z^s(R(z, x) \wedge \check{}S(z))](\hat{}\lambda z^s$[available′($z^s$)])<br>= $\lambda x^i[\exists z^s(R(z, x) \wedge$ available′$(z))]$ | <br>$\delta t$ | T13 |
| | $\lambda S \lambda x^i[\exists z^s(R(z, x) \wedge S_{wt}z)](\lambda w \lambda t \lambda z^s[available_{wt}(z)])$<br>= $\lambda x^i[\exists z^s(R(z, x) \wedge available_{wt}(z))]$ | <br>$\delta t$ | |
| **4** | $\lambda y^o$[dog′$(y)$]<br>$\lambda y^o[dog_{wt}(y)]$ | $\boldsymbol{\beta t}$<br>$\boldsymbol{\beta t}$ | p. 257, (1) **NB: $\boldsymbol{\delta t \rightarrow \beta t}$** |
| **5** | $\lambda P[\check{}P(\iota x^k.\forall y^o\Box(R(y, x) \leftrightarrow$ dog′$(y)))]$<br>=: $\lambda P[\check{}P(d)]$ | $(s\delta t)t$ | T6, p. 261 **NB: *correct*** |
| | $\lambda P[P_{wt}(\iota x^k.\forall y^o \forall w \forall t(R_{wt}(y, x) \leftrightarrow dog_{wt}(y)))]$<br>=: $\lambda P[P_{wt}$(KND *dog*)$]$ | $(\omega\tau\delta t)t$ | |
| **6** | $\exists z^s(R(z, d) \wedge$ available′$(z))$<br>\|= $\exists y^o(R'(y, d) \wedge \exists z^s[R(z, y) \wedge$ available′$(z)])$<br>= $\exists y^o($dog′$(y) \wedge \exists z^s[R(z, y) \wedge$ available′$(z)])$ | $t$<br><br><br> | T30, def. Sorted IL<br>p. 267, MP7<br>def. *d* above |
| | $\exists z^s(R(z,$ KND *dog*$) \wedge available_{wt}(z))$<br>\|= $\exists y^o(dog_{wt}(y) \wedge \exists z^s(R(z, y) \wedge available_{wt}(y)))$ | $t$<br> | |

i.e. In (the *speech world*) *w* at (the *speech time*) *t*, there is an available stage of the dog-kind
**Entails**: In (the *speech world*) *w* at (the *speech time*) *t*, there is an available stage of some dog.

(6) Dogs are *intelligent*.

| [do$_{+pres}$]$_V$ | $[dog]$_N$ | [intelligent]$_{Adj}$ |
|---|---|---|
| ——— B11 | ——— B1, S2, S3 | ——— B1 |
| t/t: **6** | CN′: **3** | IV: **1** |
| | ——— S6 | ——— S22 |
| | T: **4** | IV′: **2** |
| | ——— S29 | |
| | t ([[$dog]$_T$ to [[be$_1$]$_V$ intelligent]$_{IV'}$]$_t$): **5** | |
| ——— S30 | | |
| t ([$dog]$_T$ [do$_{+pres}$]$_V$ [be$_1$ intelligent]$_{IV'}$]$_t$): **5** | | |

| | *Sorted IL-translation*<br>*Ty$_5$-translation* | *SType*<br>*Ty$_5$-type* | *Fragment 1&2 def.'s* |
|---|---|---|---|
| **1** | $\lambda y^o$[intelligent′($y$)]<br>$\lambda y^o$[*intelligent*$_{wt}$($y$)] | $\beta t$<br>$\beta t$ | p. 257, (1) |
| **3** | $\lambda x^i$[**G**′(ˆintelligent′)($x$)]<br>$\lambda x^i$[***G***′$_{wt}$(*intelligent*)($x$)] | $\kappa t$<br>$\kappa t$ | T22, type **G**′ on p. 259 |
| **5** | $\lambda P$[ˇ$P$($\iota x^k$.$\forall y^o\Box$($R$′($y$, $x$) ↔ dog′($y$)))]<br>=: $\lambda P$[ˇ$P$($d$)] | ($s\delta t$)$t$ | T6, p. 261 |
| | $\lambda P$[$P_{wt}$($\iota x^k$.$\forall y^o \forall w \forall t$($R$′($y$, $x$) ↔ *dog*$_{wt}$($y$)))]<br>=: $\lambda P$[$P_{wt}$(KND *dog*) | ($\omega\tau\delta t$)$t$ | |
| 6 | **G**′(intelligent′)($d$)<br>\|= **H** $\exists y^o$ $R$′($y$, $d$) → **H** $\exists y^o$($R$′($y$, $d$) ∧ intelligent′($z$))<br>= **H** $\exists y^o$(dog′($y$) ∧ intelligent′($z$)) | $t$ | T30, def. Sorted IL<br>**MP10**<br>**H** $\exists y^o$ $R$′($y$, $d$), def. $d$ |
| | ***G***′$_{wt}$(*intelligent*)(KND *dog*)<br>\|= $\exists t'(t' < t \wedge \exists y^o(dog_{wt}(y) \wedge intelligent_{wt}(y)))$ | $t$ | |

i.e. In (the *speech world*) $w$ at (the *speech time*) $t$, the dog-kind is '***generally*' (G′)** intelligent
**Entails**: If in (the *speech world*) $w$ before (the *speech time*) $t$ there is a dog, then in $w$ before $t$ there is a dog that is intelligent.

That is, in the relevant respects **G′** is interpreted like **G**, so the same comments apply (see habitual ***rdg* 1** of (2))

# Q-ADVERBS AND TRANSITIVE VERBS

## 1 BARE PLURAL SUBJECT WITH(OUT) Q-ADVERB

(1) Dogs bark.

| $[do_{+pres}]_V$ | $\$[dog]_N$ | $[bark]_V$ |
|---|---|---|
| ——— s1 | ——— s1, s2 | ——— s1 |
| t/t: **6** | CN: **3** | IV: **1** |
| | ——— s3 | ——— s21 |
| | CN′: **3** | IV′: **2** |
| | ——— s6 | |
| | T: **4** | |
| | ——— s29 | |
| | t ($[\$dog]_T$ to $[bark]_{IV'}$): **5** | |
| ——— s30 | | |
| t ($[[\$dog]_T$ $[do_{+pres}]_V$ $[bark]_{IV'}]_t$): **5** | | |

| | *Sorted IL-translation*<br>*Ty₅-translation* | *SType*<br>*Ty₅-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda z^s[\text{bark}^+(z)]$ | $\sigma t$ | T1.o, c:2 |
| | $\lambda z^s[bark_{wt}(z)]$ | $\sigma t$ | |
| **2** | $\lambda x^i[\mathbf{G}(\hat{}\text{bark}^+)(x)]$ | $\delta t$ | |
| | $\lambda x^i[\boldsymbol{G}_{wt}(bark)(x)]$ | $\delta t$ | |
| **3** | $\lambda y^o[\text{dog}'(y)]$ | $\beta t$ | T1.o, c:1 |
| | $\lambda y^o[dog_{wt}(y)]$ | $\beta t$ | |
| **4** | $\lambda P[\check{}P(\iota x^k.\forall y^o\Box(R'(y, x) \leftrightarrow \text{dog}'(y)))]$ | $(s\delta t)t$ | |
| | =: $\lambda P[\check{}P(d)]$ | | |
| | $\lambda P[P_{wt}(\iota x^k.\forall y^o\forall w\forall t(R'_{wt}(y, x) \leftrightarrow dog_{wt}(y)))]$ | $(\omega\tau\delta t)t$ | |
| | =: $\lambda P[P_{wt}(\text{KND } dog)]$ | | |
| **5** | $\mathbf{G}(\hat{}\text{bark}^+)(d)$ | $t$ | |
| | \|= $\mathbf{H}\exists z^s R'(z, d) \rightarrow \mathbf{H}\exists z^s(R(z, d) \wedge \text{bark}'(z))$ | | MP9 |
| | \|= $\mathbf{H}\exists z^s R'(z, d) \rightarrow \mathbf{H}\exists y^o\exists z^s(R'(y, d) \wedge R(z, y) \wedge \text{bark}'(z))$ | | MP7 |
| | \|= $\mathbf{H}\exists z^s R'(z, d) \rightarrow \mathbf{H}\exists y^o\exists z^s(\text{dog}'(y) \wedge R(z, y) \wedge \text{bark}'(z))$ | | **4**:df. *d* |
| | \|= $\mathbf{H}\exists y^o\exists z^s(\text{dog}'(y) \wedge R(z, y) \wedge \text{bark}'(z))$ | | $\mathbf{H}\exists z^s R'(z, d)$ |
| | $\boldsymbol{G}_{wt}(bark)(\text{KND } dog)$ | $t$ | |
| | \|= $\exists t'\exists y^o\exists z^s(t' < t \wedge dog_{wt'}(y) \wedge R_{wt}(z, y) \wedge bark_{wt'}(z))$ | | |
| **6** | $\lambda p[\check{}p]$ | $(st)t$ | T1.g, MP16 |
| | $\lambda p[p_{wt}]$ | $(\omega\tau t)t$ | |

i.e. In (the *speech world*) *w* at (the *speech time*) *t* the dog-kind is '***generally'*** (**G**) realized by barking stages of dogs.
**Entails**: In (the *speech world*) *w* before (the *speech time*) *t*, there is a barking stage of some dog.

(2) Dogs often bark.

| $[do_{+pres}]_V$ | $\$[dog]_N$ | $[often]_{Adv}$ | $[bark]_V$ |
|---|---|---|---|
| ——— s1 | ——— s1, s2 | ——— s1 | ——— s1 |
| t/t: **8** | CN: **5** | IV′/IV′: **3** | IV: **1** |
| | ——— s3 | | ——— s21 |
| | CN′: **5** | | IV′: **2** |
| | ——— s6 | ——— s14 | |
| | T: **6** | IV′: **4** | |
| | ——— s29 | | |
| | t ($[\$dog]_T$ to $[often\ bark]_{IV'}$): **7** | | |
| ——— s30 | | | |
| t ($[[\$dog]_T\ [do_{+pres}]_V\ [often\ bark]_{IV'}]_t$): **9** | | | |

| | *Sorted IL-translation*<br>*Ty$_5$-translation* | *SType*<br>*Ty$_5$-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda z^s[\text{bark}^+(z)]$<br>$\lambda z^s[bark_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | T1.o, c:2 |
| **2** | $\lambda x^j[\mathbf{G}(\hat{}\text{bark}^+)(x)]$<br>$\lambda x^j[\boldsymbol{G}_{wt}(bark)(x)]$ | $\delta t$<br>$\delta t$ | |
| **3** | $\lambda P\lambda x^k[\text{Many } y^o(R'(y, x) \wedge \check{}P(y))]$<br>$\lambda P\lambda x^k[many(\lambda y^o[R'_{wt}(y, x) \wedge P_{wt}(y)])]$ | $(\beta t)\kappa t$<br>$(\beta t)\kappa t$ | T1.i |
| **4** | $\lambda x^k[\text{Many } y^o(R'(y, x) \wedge \mathbf{G}(\hat{}\text{bark}^+)(y))]$<br>$\lambda x^k[many(\lambda y^o[R'_{wt}(y, x) \wedge \boldsymbol{G}_{wt}(bark)(y)])]$ | $\kappa t$<br>$\kappa t$ | |
| **6** | $\lambda P[\check{}P(\iota x^k[\forall y^o\Box(R'(y, x) \leftrightarrow \text{dog}'(y))])$<br>=: $\lambda P[\check{}P(d)]$ | $(s\delta t)t$ | |
| | $\lambda P[P_{wt}(\iota x^k \forall y^o \forall w \forall t(R'_{wt}(y, x) \leftrightarrow dog_{wt}(y)))$<br>=: $\lambda P[P_{wt}(\text{KND } dog)]$ | $(\omega\tau\delta t)t$ | |
| **7** | Many $y^o(R'(y, d) \wedge \mathbf{G}(\hat{}\text{bark}^+)(y))$<br>= Many $y^o(\text{dog}'(y) \wedge \mathbf{G}(\hat{}\text{bark}^+)(y))$ | $t$ | **6**: df. $d$ |
| | $many(\lambda y^o[R'_{wt}(y, \text{KND } dog) \wedge \boldsymbol{G}_{wt}(bark)(y)])$<br>= $many(\lambda y^o[dog_{wt}(y) \wedge \boldsymbol{G}_{wt}(bark)(y)])$ | $t$ | **6**: df. KND $dog$ |
| **8** | $\lambda p[\check{}p]$<br>$\lambda p[p_{wt}]$ | $(st)t$<br>$(\omega\tau t)t$ | T1.g, MP16 |
| **9** | Many $y^o(\text{dog}'(y) \wedge \mathbf{G}(\hat{}\text{bark}^+)(y))$<br>$many(\lambda y^o[dog_{wt}(y) \wedge \boldsymbol{G}_{wt}(bark)(y)])$ | $t$<br>$t$ | |

i.e. In (the *speech world*) *w* at (the *speech time*) *t* there is a large number of entities that are dogs and **G**-bark (i.e., given MP9, have a past barking stage.)

cf. (3) Many dogs bark.

| $[do_{+pres}]_V$ | $\$[many]_Q$ | $\$[dog]_N$ | $[bark]_V$ |
|---|---|---|---|
| s1 | s1 | s1,2 | s1 |
| t/t: **7** | T/CN′: **4** | CN: **3** | IV: **1** |
| | | s3 | s21 |
| | | CN′: **3** | IV′: **2** |
| | s4 | | |
| | T ([$[$many]$_{T/CN'}$[$dog]$_{CN'}$]): **5** | | |
| | s29 | | |
| | t ([[$ $many $dog]$_T$ to [bark]$_{IV'}$]$_t$): **6** | | |
| s30 | | | |
| t ([[$ $many $dog]$_T$ [$do_{+pres}$]$_V$ [bark]$_{IV'}$]): **8** | | | |

| | *Sorted IL-translation*<br>*$Ty_5$-translation* | *SType*<br>*$Ty_5$-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda z^s[\text{bark}^+(z)]$<br>$\lambda z^s[bark_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | T1.o, c:2 |

⋮

2 BARE PLURAL OBJECT OF TRANSITIVE VERB

(4) Dogs were chasing cats. (*prg.* stage-level TV)

| $[do_{-pres}]_V$ | $\$[dog]_N$ | $[be_2]_V$ | -ing | $[chase]_V$ | $\$[cat]$ |
|---|---|---|---|---|---|
| s1 | s1, s2 | s1 | s1 | s1 | s1, s2 |
| t/t: **12** | CN: **9** | IV′/IV: **7** | IV//IV: **5** | IV/T: **3** | CN: **1** |
| | s3 | | | | s3 |
| | CN′: **9** | | | | CN′: **1** |
| | s6 | | | | s6 |
| | T: **10** | | | | T: **2** |
| | | | | s17 | |
| | | | | IV ([chase]$_V$ [$cat]$_T$): **4** | |
| | | | s11 | | |
| | | | IV ([[chase-ing]$_{Adj}$ [$cat]$_T$]$_{IV}$): **6** | | |
| | | s13 | | | |
| | | IV′: **8** | | | |
| | s29 | | | | |
| | t ([$dog]$_T$ to [$be_2$ chase-ing $cat]$_{IV'}$): **11** | | | | |
| s30 | | | | | |
| t ([[$dog]$_T$ $do_{+pres}$ [[$be_2$]$_V$ chase-ing]$_{IV'}$ $cat]$_t$): **13** | | | | | |

| | *Sorted IL-translation*<br>*$Ty_5$-translation* | *SType*<br>*$Ty_5$-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda y^o[\text{cat}'(y)]$<br>$\lambda y^o[cat_{wt}(y)]$ | $\beta t$<br>$\beta t$ | T1.o, c:1 |

⋮

(5) Dogs chase cats. (*hab.* object-level TV)

| $[do_{-pres}]_V$ | $\$[dog]_N$ | $[chase]_V$ | $\$[cat]$ |
|---|---|---|---|
| ——— s1 | ——— s1, s2 | ——— s1 | ——— s1, s2 |
| t/t: **9** | CN: **6** | IV/T: **3** | CN: **1** |
| | ——— s3 | | ——— s3 |
| | CN′: **6** | | CN′: **1** |
| | ——— s6 | | ——— s6 |
| | T: **7** | | T: **2** |
| | | ——— s17 | |
| | | IV ($[chase]_V$ $[\$cat]_T$): **4** | |
| | | ——— s21 | |
| | | IV′: **5** | |
| | ——— s29 | | |
| | t ($[\$dog]_T$ to $[chase\ \$cat]_{IV'}$): **8** | | |

——— s30

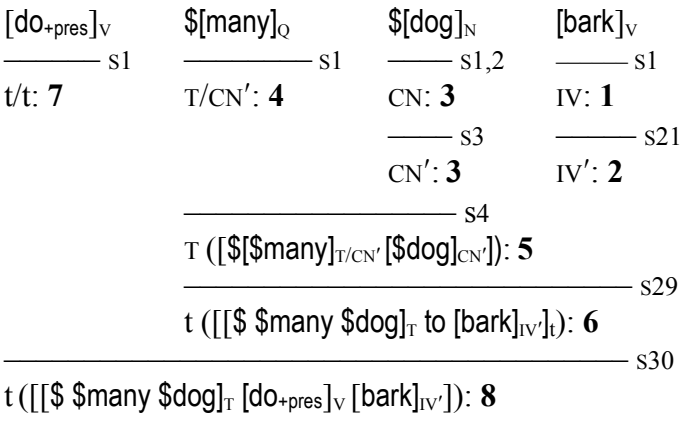
t ($[[\$dog]_T$ $[do_{-pres}]_V$ $[chase\ \$cat]_{IV'}]_t$): **8**

| | *Sorted IL-translation*<br>*$Ty_5$-translation* | *SType*<br>*$Ty_5$-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda y^{o}[\mathrm{cat}'(y)]$<br>$\lambda y^{o}[cat_{wt}(y)]$ | $\beta t$<br>$\beta t$ | T1.o, c:1 |

⋮

## APPENDIX: ANALYSIS OF (3)–(5)

(3) Many dogs bark.




| | *Sorted IL-translation*<br>*Ty5-translation* | *SType*<br>*Ty5-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda z^s[\text{bark}^+(z)]$<br>$\lambda z^s[bark_{wt}(z)]$ | $\sigma t$<br>$\sigma t$ | T1.o, c:2 |
| **2** | $\lambda x^i[\mathbf{G}(\hat{}\text{bark}^+)(x)]$<br>$\lambda x^i[\boldsymbol{G}_{wt}(bark)(x)]$ | $\delta t$<br>$\delta t$ | |
| **3** | $\text{dog}'$<br>$\lambda z^i[dog_{wt}(z)]$ | $\delta t$<br>$\delta t$ | T1.o, c:1 |
| **4** | $\lambda P'\lambda P[\text{Many } x^i(\check{}P'(x) \wedge \check{}P(x))]$<br>$\lambda P'\lambda P[many(\lambda x^i[P'_{wt}(x) \wedge P_{wt}(x)])]$ | $(s\delta t)(s\delta t)t$<br>$(\omega\tau\delta t)(\omega\tau\delta t)t$ | T1.c |
| **5** | $\lambda P[\text{Many } x^i(\text{dog}'(x) \wedge \check{}P(x))]$<br>$\lambda P[many(\lambda x^i[dog_{wt}(x) \wedge P_{wt}(x)])]$ | $(s\delta t)t$<br>$(\omega\tau\delta t)t$ | |
| **6** | $\text{Many } x^i(\text{dog}'(x) \wedge \mathbf{G}(\hat{}\text{bark}^+)(x))$<br>$many(\lambda x^i[dog_{wt}(x) \wedge \boldsymbol{G}_{wt}(bark)(x)])$ | $t$<br>$t$ | |
| **7** | $\lambda p[\check{}p]$<br>$\lambda p[p_{wt}]$ | $(st)t$<br>$(\omega\tau t)t$ | |
| **6** | $\text{Many } x^i(\text{dog}'(x) \wedge \mathbf{G}(\hat{}\text{bark}^+)(x))$<br>$many(\lambda x^i[dog_{wt}(x) \wedge \boldsymbol{G}_{wt}(bark)(x)])$ | $t$<br>$t$ | |

i.e. In (the *speech world*) *w* at (the *speech time*) *t* there is a large number of entities that are dogs and **G**-bark (i.e., given MP9, have a past barking stage.)

***Predict***: (2) ≡ (3′)

(2) Dogs often bark.

(3′) There are many dogs that bark.

**MB *intuition***: ? (unclear)

(4) Dogs were chas*ing* cats. (*prg.* stage-level tv)

| $[do_{-pres}]_V$ | $\$[dog]_N$ | $[be_2]_V$ | -ing | $[chase]_V$ | $\$[cat]$ |
|---|---|---|---|---|---|
| ——— s1 | ——— s1, s2, s3 | ——— s1 | ——— s1 | ——— s1 | ——— s1, s2, s3 |
| t/t: **12** | CN′: **9** | IV′/IV: **7** | IV//IV: **5** | IV/T: **3** | CN′: **1** |
| | ——— s6 | | | | ——— s6 |
| | T: **10** | | | | T: **2** |
| | | | | ——— s17 | |
| | | | | IV ([chase]V [$cat]T): **4** | |
| | | | ——— s11 | | |
| | | | IV ([[chase-ing]Adj [$cat]T]IV): **6** | | |
| | | ——— s13 | | | |
| | | IV′: **8** | | | |
| | ——— s29 | | | | |
| | t ([$dog]T to [be2 chase-ing $cat]IV′): **11** | | | | |
| ——— s30 | | | | | |
| t ([[$dog]T do+pres [[be2]V chase-ing]IV′ $cat]t): **13** | | | | | |

| | *Sorted IL-translation*<br>*Ty5-translation* | *SType*<br>*Ty5-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda y^{o}[\text{cat}'(y)]$<br>$\lambda y^{o}[cat_{wt}(y)]$ | $\beta t$<br>$\beta t$ | T1.o, c:1 |
| **2** | $\lambda P[\check{}P(\iota x^{k}.\forall y^{o}\Box(R(y, x) \leftrightarrow \text{cat}'(y)))]$<br>$=: \lambda P[\check{}P(c)]$<br>$\lambda P[P_{wt}(\iota x^{k}.\forall y^{o}\forall w\forall t(R_{wt}(y, x) \leftrightarrow cat_{wt}(y)))]$<br>$=: \lambda P[P_{wt}(\text{KND } cat)]$ | $(s\delta t)t$<br><br>$(\omega\tau\delta t)t$ | T6, p. 261 |
| **3** | $\lambda\mathcal{Q}\lambda z_1^{s}[\check{}\mathcal{Q}(\hat{}\lambda y^{i}[\exists z_2^{s}(R(z_2, y) \wedge \text{chase}^{+}(z_1, z_2))])]$<br>$\lambda\mathcal{Q}\lambda z_1^{s}[\mathcal{Q}_{wt}(\lambda w\lambda t\lambda y^{i}[\exists z_2^{s}(R_{wt}(z_2, y) \wedge chase_{wt}(z_1, z_2))])]$ | $((s\delta t)t)et$<br>$((\omega\tau\delta t)t)et$ | |
| **4** | $\lambda z_1^{s}[\exists z_2^{s}(R(z_2, c) \wedge \text{chase}^{+}(z_1, z_2))]$<br>$\lambda z_1^{s}[\exists z_2^{s}(R_{wt}(z_2, \text{KND } cat) \wedge chase_{wt}(z_1, z_2))]$ | $\sigma t$<br>$\sigma t$ | |
| **6** | $\text{prg}'(\hat{}\lambda z_1^{s}[\exists z_2^{s}(R(z_2, c) \wedge \text{chase}^{+}(z_1, z_2))])$<br>$prg_{wr}(\lambda w\lambda t\lambda z_1^{s}[\exists z_2^{s}(R_{wt}(z_2, \text{KND } cat) \wedge chase_{wt}(z_1, z_2)])$ | $\sigma t$<br>$\sigma t$ | |
| **8**. | $\lambda x^{i}[\exists z^{s}(R(z, x) \wedge \text{prg}'(\hat{}\lambda z_1^{s}[\exists z_2^{s}(R(z_2, c) \wedge \text{chase}^{+}(z_1, z_2))])(z))]$<br>$\lambda x^{i}[\exists z^{s}(R_{wt}(z, x) \wedge prg_{wr}(\lambda w\lambda t\lambda z_1^{s}[\exists z_2^{s}(R_{wt}(z_2, \text{KND } cat)$<br>$\wedge chase_{wt}(z_1, z_2)])(z))]$ | $\delta t$<br><br>$\delta t$ | |
| **10** | $\lambda P[\check{}P(d)]$<br>$\lambda P[P_{wt}(\text{KND } dog)]$ | $(s\delta t)t$<br>$(\omega\tau\delta t)t$ | T6, p. 261 |
| **11** | $\mathbf{H}\exists z^{s}(R(z, d) \wedge \text{prg}'(\hat{}\lambda z_1^{s}[\exists z_2^{s}(R(z_2, c) \wedge \text{chase}^{+}(z_1, z_2))])(z))$<br>$\exists t'\exists z^{s}(t' < t \wedge R_{wt}(z, \text{KND } dog) \wedge$<br>$prg_{wt}(\lambda w\lambda t\lambda z_1^{s}[\exists z_2^{s}(R_{wt}(z_2, \text{KND } cat) \wedge chase_{wt}(z_1, z_2)])(z))$ | $t$<br>$t$ | |

i.e. In (the *speech world*) $w$ at some time in the past of (the *speech time*) $t$, there was a stage $z^{s}$ of some dog in progress of acquiring the property of chasing a cat (stage of the cat-kind).

(5) Dogs chase cats. (*hab.* object-level tv)

| $[do_{-pres}]_V$ | $\$[dog]_N$ | $[chase]_V$ | $\$[cat]$ |
|---|---|---|---|
| ——— s1 | ——— s1, s2, s3 | ——— s1 | ——— s1, s2, s3 |
| t/t: **9** | CN′: **6** | IV/T: **3** | CN′: **1** |
| | ——— s6 | | ——— s6 |
| | T: **7** | | T: **2** |
| | | ——— s17 | |
| | | IV ([chase]V [$cat]T): **4** | |
| | | ——— s21 | |
| | | IV′: **5** | |
| | ——— s29 | | |
| | t ([$dog]T to [chase $cat]IV′): **8** | | |
| ——— s30 | | | |
| t ([[$dog]T [$do_{-pres}$]V [chase $cat]IV′]t): **8** | | | |

| | *Sorted IL-translation*<br>*$Ty_5$-translation* | *SType*<br>*$Ty_5$-type* | *Remarks* |
|---|---|---|---|
| **1** | $\lambda y^{o}[\text{cat}'(y)]$<br>$\lambda y^{o}[cat_{wt}(y)]$ | $\beta t$<br>$\beta t$ | T1.o, c:1 |
| **2** | $\lambda P[\check{}P(\iota x^{k}.\forall y^{o}\Box(R(y, x) \leftrightarrow \text{cat}'(y)))]$<br>$=: \lambda P[\check{}P(c)]$ | $(s\delta t)t$ | T6, p. 261 |
| | $\lambda P[P_{wt}(\iota x^{k}.\forall y^{o}\forall w\forall t(R_{wt}(y, x) \leftrightarrow cat_{wt}(y)))]$<br>$=: \lambda P[P_{wt}(\text{KND } cat)]$ | $(\omega\tau\delta t)t$ | |
| **3** | $\lambda\mathcal{Q}\lambda z_1^{s}[\check{}\mathcal{Q}(\hat{}\lambda y^{i}[\exists z_2^{s}(R(z_2, y) \wedge \text{chase}^{+}(z_1, z_2))])]$<br>$\lambda\mathcal{Q}\lambda z_1^{s}[\mathcal{Q}_{wt}(\lambda w\lambda t\lambda y^{i}[\exists z_2^{s}(R_{wt}(z_2, y) \wedge chase_{wt}(z_1, z_2))])]$ | $((s\delta t)t)et$<br>$((\omega\tau\delta t)t)et$ | |
| **4** | $\lambda z_1^{s}[\exists z_2^{s}(R(z_2, c) \wedge \text{chase}^{+}(z_1, z_2))]$<br>$\lambda z_1^{s}[\exists z_2^{s}(R_{wt}(z_2, \text{KND } cat) \wedge chase_{wt}(z_1, z_2))]$ | $\sigma t$<br>$\sigma t$ | |
| **5** | $\mathbf{G}(\hat{}\lambda z_1^{s}[\exists z_2^{s}(R(z_2, c) \wedge \text{chase}^{+}(z_1, z_2))])$<br>$\boldsymbol{G}_{wt}(\lambda w\lambda t\lambda z_1^{s}[\exists z_2^{s}(R_{wt}(z_2, \text{KND } cat) \wedge chase_{wt}(z_1, z_2))])$ | $\delta t$<br>$\delta t$ | |
| **6** | $\lambda y^{o}[\text{dog}'(y)]$<br>$\lambda y^{o}[dog_{wt}(y)]$ | $\beta t$<br>$\beta t$ | T1.o, c:1 |
| **7** | $\lambda P[\check{}P(\iota x^{k}.\forall y^{o}\Box(R(y, x) \leftrightarrow \text{dog}'(y)))]$<br>$=: \lambda P[\check{}P(d)]$ | $(s\delta t)t$ | T6, p. 261 |
| | $\lambda P[P_{wt}(\iota x^{k}.\forall y^{o}\forall w\forall t(R_{wt}(y, x) \leftrightarrow dog_{wt}(y)))]$<br>$=: \lambda P[P_{wt}(\text{KND } dog)]$ | $(\omega\tau\delta t)t$ | |
| **8** | $\mathbf{G}(\hat{}\lambda z_1^{s}[\exists z_2^{s}(R(z_2, c) \wedge \text{chase}^{+}(z_1, z_2))])(d)$<br>$\boldsymbol{G}_{wt}(\lambda w\lambda t\lambda z_1^{s}[\exists z_2^{s}(R_{wt}(z_2, \text{KND } cat) \wedge chase_{wt}(z_1, z_2))])(\text{KND } dog)$ | $t$<br>$t$ | |

i.e. In (*speech world*) *w* at (*speech time*) *t*, the dog-kind is '***generally'*** (**MB**: **??!…)** realized by stages (temporal slices of dogs) that are chasing stages of the cat-kind (tmp. slices of cats).