Quantificational States & Argument Separation

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Under Davidsonian proposals, the semantics of relational Vs goes from (1a) → (1b) → (1c). Similarly (in principle) for relational As (2a-c), Ps (3a-c) and Ns (4a-c).
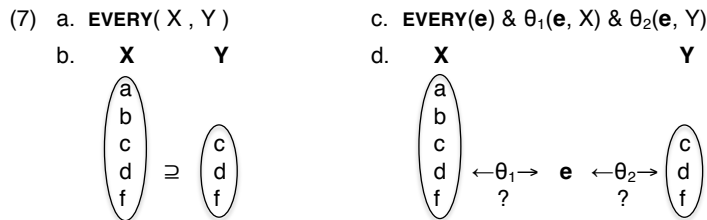
(1) Shem **kicked** Shaun.
    a. **kick**(x, y)
    b. **kick**(x, y, **e**)
    c. **kicking**(**e**) & θ_1(**e**, x) & θ_2(**e**, y)
          "ARGUMENT SEPARATION"

(2) Shem is **envious** of Shaun.
    a. **envious-of**(x, y)
    b. **envious-of**(x, y, **e**)
    c. **envy**(**e**) & θ_1(**e**, x) & θ_2(**e**, y)

(3) Shem is **near** Shaun.
    a. **near**(x, y)
    b. **near** (x, y, **e**)
    c. **proximity**(**e**) & θ_1(**e**, x) & θ_2(**e**, y)

(4) Shem is a **relative** of Shaun.
    a. **relative-of**(x, y)
    b. **relative-of**(x, y, **e**)
    c. **kinship**(**e**) & θ_1(**e**, x) & θ_2(**e**, y)

Consider now quantifiers, widely taken to express relations between properties (5a)/(6a). Are state variables motivated here too (5b)/(6b)? Is argument separation desirable, or even possible (5c)/(6b)?

(5) **All** men complain.
    a. **ALL**(X , Y)
    b. **ALL**(X , Y, **e**)
    c. **P**(**e**) & θ_1(**e**, X) & θ_2(**e**, Y)

(6) Men **always** complain.
    a. **ALWAYS**(X , Y)
    b. **ALWAYS**(X , Y, **e**)
    c. **P**(**e**) & θ_1(**e**, X) & θ_2(**e**, Y)

The answers are far from clear.

- With V, A, P and N we have some intuitive grasp on the events/states involved, and plausible relations to them. With quantification these notions are obscure.

- Surely if <u>anything</u> would seem to embody a pure relation between individuals, it's a Q-relation, which simply evaluates cardinalities, proportions, etc. of sets of <u>individuals</u> (7a,b). What happens to this relation with a state interposed (7c,d)?

(7) a. **EVERY**(X , Y)
    c. **EVERY**(**e**) & θ_1(**e**, X) & θ_2(**e**, Y)

    b.   **X**   **Y**   d. **X**   **Y**

$$\begin{pmatrix} a \\ b \\ c \\ d \\ f \end{pmatrix} \supseteq \begin{pmatrix} c \\ d \\ f \end{pmatrix} \qquad \begin{pmatrix} a \\ b \\ c \\ d \\ f \end{pmatrix} \leftarrow\theta_1\rightarrow \; \mathbf{e} \; \leftarrow\theta_2\rightarrow \begin{pmatrix} c \\ d \\ f \end{pmatrix}$$
$$? \qquad\qquad ?$$

We seem to be trying to "Davidsonianize" set theory.

Nonetheless, in this talk, I will argue that under certain assumptions:

- Quantificational state variables <u>do</u> seem to be motivated.
- Argument separation with quantifiers is both desirable conceptually and possible technically.

I will take these points in order.

1.0 Motivating the State Parameter

The idea of quantificational states is not unprecedented. Barwise and Perry (1985) offer a similar notion within situation semantics (8).

(8) Some animal is eating.
    S_3 = [**s$_3$** | in **s$_3$**: co-instantiated, [**x** | in **s$_3$**: animal, **x**; yes],
                               [**y** | in **s$_3$**: at l: eating, **y**, b; yes]; yes]

In this framework, the motivation is largely "architectural". Ss describe situations. Hence quantificational Ss must describe quantificational situations. Hence there must be quantificational situations to describe.

In a Davidsonian framework, we can find motivation in elements that express relations to eventualities: causatives, perception verbs and adverbial quantifiers.

1.1 Causing Quantificational States

Davidson (1967a) proposes that causation is a relation between eventualities (9) (which include both events and states)

(9)   CAUSE(e , e')

(10) a. John's sneezing made Mary leave.
     b. John's sneezing   ⇒ ιe[sneeze(John,e)]
     c. Mary leave   ⇒ ∃e'[leave(Mary,e')]
     d. John's sneezing made Mary leave ⇒
         ∃e' leave(Mary,e') & **CAUSE**(ιe[sneeze(John,e)] , e')]

If this view is adopted, reference to Q-states seems motivated. Consider (11-12) from Johnston (1994):

(11) a. Leopold always robs a bank because he needs money fast.
     b. Frankie always misses the bus because he is a slow runner.
       (cf. *Because he is a slow runner Frankie always misses the bus.*)

(12) John always sold shares because he needed the money.
   a. 'Each event of John's selling shares was caused by a state of John's
      needing money'
   b. 'John's need for money caused a certain behavioral pattern, viz.: John's
      always selling shares.'
      (cf. *Because he needed the money John always sold shares.*)

In (11a)/(12a) individual states cause individual events. But (11b) and (12b), a state
causes a "quantificational pattern". Consider also (13):

(13) a. [a dog's biting him in childhood] made
        [John always become nervous when a dog was near him].
     b. [Fido's conditioning] caused his salivating.

Always binds all events variables in its scope; hence without a state corresponding
to *always* itself, **CAUSE** will have no second event to relate to (14). We appear to
need something like (15):

(14) **CAUSE**(ιe [a-dog's-biting-John(e)] , **??**)
     ALWAYS({e": John-become-nervous(e")} , {e*: a-dog-near-John(e*)})

(15) ∃ **e** [**CAUSE**(ιe [a-dog's-biting-John(e)] , **e**) &
     ALWAYS({e": John-become-nervous(e")} , {e*: a-dog-near-John(e*)} , **e**)

1.2 Perceiving Quantificational States

Higginbotham (1983) and Vlach (1983) argue that perception is a relation between
individuals (x,y), where the latter (y) can be an eventuality (16).

(16) SEE/HEAR(x , y , e)

(17) a. John heard Mary leave.
     b. Mary leave.   ⇒ ∃ e' [leave(Mary,e')]
     d. John heard Mary leave ⇒ ∃ e ∃ e'[leave(Mary,e') & **HEAR**(John, e' , e)]

Again, if this view is adopted, reference to Q-states seems natural. Consider (18a,b).

(18) a. John heard Mary frequently complain about her job.
        (≠ John frequently heard Mary complain about her job.)
     b. John saw Mary often leave before 5:00pm.
        (≠ John often saw Mary leave before 5:00pm.)

In both it seems John sees/hears, not specific events, but instead a regular pattern
of behavior on Mary's part - a state.

Frequently binds all events variables in its scope; without a state corresponding to
frequently itself, **HEAR** has no second event to relate to (19). We appear to need
something like (20):

(19) ∃ e' [**HEAR**(John , **??** , e') &
     FREQ({e": Mary-complain-about-job(e")} , {e*: C(e*)})

(20) ∃ **e** ∃ e' [**HEAR**(John , **e** , e') &
     FREQ({e": Mary-complain-about-job(e")} , {e*: C(e*)}, **e**)

1.3 Quantifying Over Quantificational States

Adverbial quantifiers have been analyzed as quantifying over eventualities
(Herburger 2000). In GQ terms, this means relating sets (21)/(22a,b).

(21) **ALWAYS**({e: P(e)} , {e*: Q(e*)})

(22) a. John **always** eats in the hotel restaurant.
     b. **ALWAYS**({e: John-eats-in-HR(e)} , {e*: C(e*)})

If this is correct, then consider sentences involving multiple adverbial Qs (23a,b).

(23) a. **Usually** (when he is staying at the Four Seasons)
        John **always** eats in the hotel restaurant.
     b. **Often** (when he in feeling down)
        John will **frequently** visit a casino./John will frequent casinos.

In both we seem to be saying of a certain pattern of behavior on John's part – his
always eating somewhere, his frequently visiting something, etc. – that it is attested
with a certain frequency – that it is usual in certain circumstances, that it is frequent,
etc.

In (23a) *always* binds the eventuality variables in its scope; hence without a state
corresponding to *always* itself, binding by $e^{\dagger}$ in the first arg of *usually* is vacuous
(24). We appear to need something like (25):

(24) **USUALLY(**
     { **e**^†: **ALWAYS**({e: John-eats-in-HR(e)} , {e*: C(e*)})} , { e^‡: John-stay-at-4S(e^‡)} **)**
                              e^† **??**

(25) **USUALLY(**
     { **e**^†: **ALWAYS**({e: John-eats-in-HR(e)} , {e*: C(e*)}, **e**^†)},
                                        { e^‡: John-stay-at-4S(e^‡)} , **e*** **)**
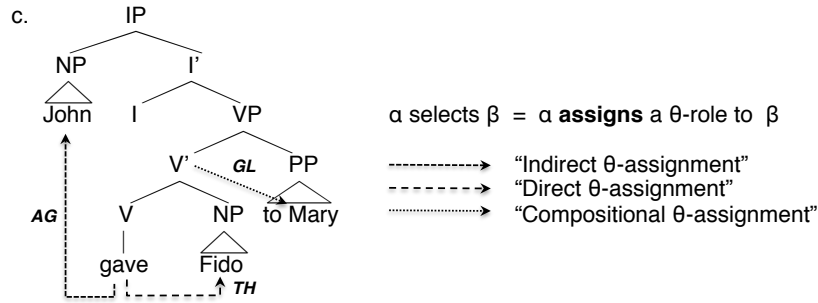
2.0 Motivating Argument Separation I

Arg-separation with V provides a clear semantic basis for the syntactic notion **θ-role** and underwrites theories of external merge based on it. Extending these benefits to other categories requires corresponding semantic notions.

2.1 θ-Roles & Selection with V

In the GB period, **θ-roles** played a key, if technically obscure, role in selection and projection.

(26) a. John gave Fido to Mary.
                "AGENT" "THEME" "GOAL"
    b. GIVE(x ,   y ,   z   )
    c.

α selects β = α **assigns** a θ-role to β

- - - - - - - - - → "Indirect θ-assignment"
- - - - - - - - - → "Direct θ-assignment"
· · · · · · · · · → "Compositional θ-assignment"

Hornstein (1999): Represent θ-roles as syntactic features - θ-features. Analyze selection/θ-assignment as θ-feature agreement (27).

(27)

gave ⟵ **AGREE** → John
[TH[ ]]   [TH[ ]]
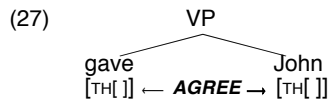
Pesetsky and Torrego (2007): Features to come in four varieties, according to whether they are interpretable/uninterpretable or valued/unvalued (28).

(28)

	INTERPRETABLE	**UNINTERPRETABLE**
VALUED	iFval	Fval
UNVALUED	iF	F

Consider θ-features in P&T's terms. Suppose we have [AG], [TH], [GL], etc. Suppose the selection relation between a predicate and an object is feature agreement

Questions:
- What does it mean for a θ-feature to be **interpretable** on expression α?
- Which expression in (27) carries the interpretable TH-feature?
- What does it mean for a θ-feature to be **valued** on expression α?
- Which expression in (27) carries the valued TH-feature?

Neo-Davidsonian arg-separation yields a plausible answer the first question and allows different answers to the second.

give(e) & **Ag**(e,x) & **Gl**(e,y) & **Th**(e,z)

Question: What does it mean for a θ-feature to be interpretable on expression α?
Answer: It means θ(e,x) is part of the interpretation of α.

Question: Which expression in (27) carries the interpretable θ-feature?
Answer: It depends on how you do composition!

ANALYSIS 1: θ-relations are folded into the lexical semantics of V. Names denote individuals (Parsons 1991).

give ➔ λzλyλx∃e[give(e) & **Ag**(e,x) & **Gl**(e,y) & **Th**(e,z)]
Mary ➔ **m**   *John* ➔ **j**   *Fido* ➔ **f**

(29) a.   vP   b. ∃e[give(e) & Ag(e,**m**) & Gl(e,**j**) & Th(e,**f**)]

λx∃e[give(e) & Ag(e,x) & Gl(e,**j**) & Th(e,**f**)]   **m**

λyλx∃e[give(e) & Ag(e,x) &Gl(e,y) & Th(e,**f**)]   **j**

λzλyλx∃e[give(e) & Ag(e,x) &Gl(e,y) & Th(e,z)]   **f**
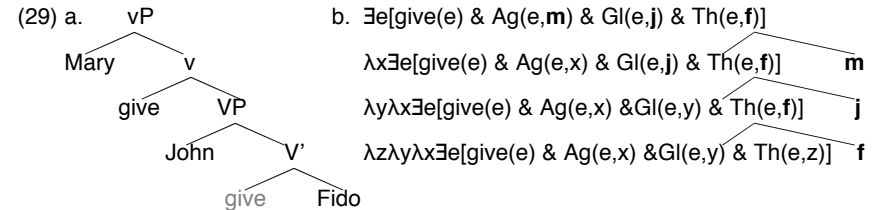
ANALYSIS 2: θ-relations come with the argument nominals. V contributes <u>only</u> the event sortal (Krifka 1993).

*give* ➔ λe[give(e)]
Mary ➔ λe[Ag(e,**m**)]   *John* ➔ λe[Gl(e,**j**)]   *Fido* ➔ λe[Th(e,**f**)]

(30) a.   vP   b. ∃e[give(e) & Ag(e,**m**) & Gl(e,**j**) & Th(e,**f**)]   *EC*

λe[give(e) & Ag(e,**m**) & Gl(e,**j**) & Th(e,**f**)]

λe[give(e) & Gl(e,**j**) & Th(e,**f**)]   λe[Ag(e,**m**)]

λe[give(e) & Th(e,**f**)]   λe[Gl(e,**j**)]

λe[give(e)]   λe[Th(e,**f**)]

On ANALYSIS 1, Th(e,y) is part of the interpretation of *give*; hence [TH] is interpretable on *give*. Presumably [TH] is valued on *Fido* (31a). On ANALYSIS 2, Th(e,y) is part of the interpretation of *Fido*. Hence [TH] as interpretable on *Fido*. [TH] is valued on *give* (31b).

(31) a.

ANALYSIS 1 ANALYSIS 2

Larson (2014) works out ANALYSIS 2 in detail using the full matrix of feature possibilities proposed by P&T:

(32)

(33)
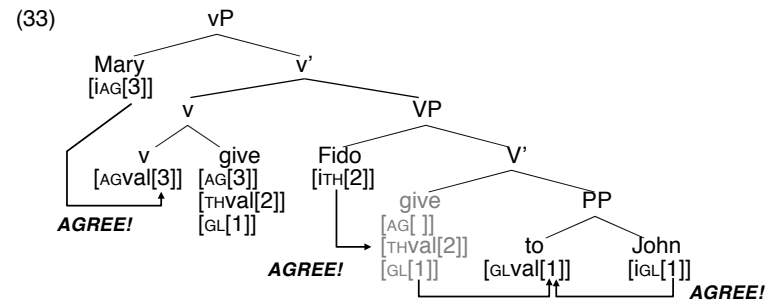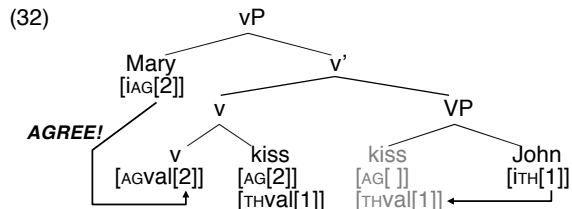
Thematic Hierarchy: [AG] > [TH] > [GL] > [LOC] > …

Constraint: A feature in a θ-set can undergo agreement only if there are no lower-ranked, unagreed features in that set.

Neo-Davidsonian arg-separation with Vs thus:

- allows GB "θ-roles" and "θ-role assignment" to be coherently recast as formal features subject to formal feature agreement
- provides a transparent understanding of "interpretable θ-feature"
- supports a theory of projection and External Merge based on θ-features

This picture seems extensible to A, P, N (2)-(4). Can it go further?

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2.2 θ-Roles & Selection with D

Relational View of Determiners: Ds express relations among predicate meanings.

(34) a. ALL(X,Y) iff $| Y - X | = 0$ **Monotransitive D**
 b. SOME(X,Y) iff $| Y \cap X |$ 0
 c. NO(X,Y) iff $| Y \cap X | = 0$
 d. MOST(X,Y) iff $| Y \cap X | > | Y - X |$
 e. TWO(X,Y) iff $| Y \cap X | = 2$ (similarly for other # Ds)
 f. THE-TWO(X,Y) iff $| Y \cap X | = 0$, where $| Y | = 2$ (similarly for *the*-n)

(35) HE$_n$(X) iff $g(n) \in X$ **Intransitive D**

(36) a. EVERY-EXCEPT(X,Y,Z) iff $|(Y - Z) - X| = 0$ & $|X \cap Z| = 0$ **Ditransitive D**
 b. Every man except Bill and James smokes
 b. $|(\{x: man(x)\} - \{Bill,James\}) - \{x: smokes(x)\}| = 0$ &
 $|\{Bill,James\}) \cap \{x: smokes(x)\}| = 0$

Set arguments play different parts in quantification (cf. 37a,b). *Y* gives the domain or **restriction**. *X* gives the "test" set or **scope**. 1st order formulae (37c) fail to capture this difference with *some*, representing *X* and *Y* contributions symmetrically (cf. 38):
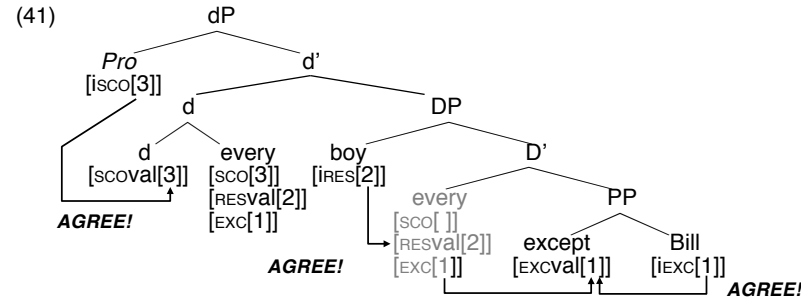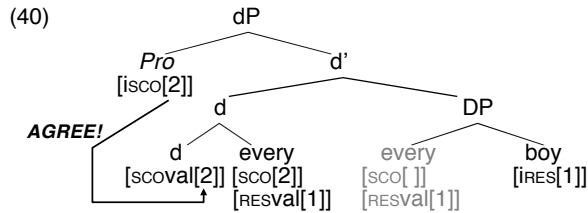
(37) a. Some [man] [runs].
 b. Some [runner] [is a man].
 c, $\exists x[man(x)$ & $runs(x)]$ = $\exists x[runs(x)$ & $man(x)]$

(38) a. Some [men] [are bachelors].
 b. Some [bachelors] [are men].

Larson (1991): Restriction and scope might be thought of as **θ-roles assigned by D** (and other quantifiers) (39a). Pronouns would assign only θ$_{SCOPE}$ *Every-except*, would assign a third role (θ$_{EXCP}$) (39b).

(39) a. θ_{SCOPE} θ_{RESTR} θ_{AGENT} θ_{THEME}
 EVERY(X , Y) KISS(x , y)

 b. θ_{SCOPE} θ_{AGENT}
 HE$_n$ (X) LAUGH(x)

 θ_{SCOPE} θ_{RESTR} θ_{EXCP} θ_{AGENT} θ_{THEME} θ_{GOAL}
 c. EVERY-EXCEPT(X , Y , Z) GIVE(x , y , z)

These ideas can be recast in terms of θ-features and θ-feature agreement in parallel with vP/VP. Compare (32/33) and (40)/(41):

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(40)

dP
Pro [isco[2]] — d'
AGREE!
d — DP
d [scoval[2]] every [sco[2]] [resval[1]]
every [sco[ ]] [resval[1]] boy [ires[1]]

(41)

dP
Pro [isco[3]] — d'
AGREE!
d — DP
d [scoval[3]] every [sco[3]] [resval[2]] [exc[1]] boy [ires[2]] D'
every [sco[ ]] [resval[2]] [exc[1]] PP
AGREE!
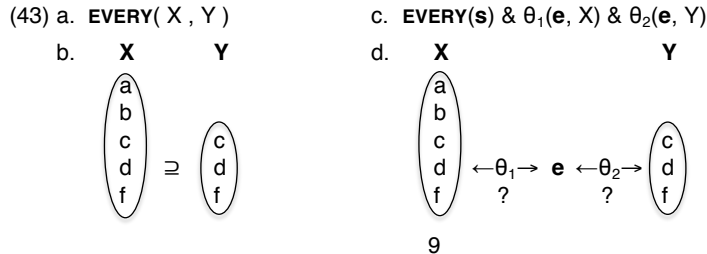except [excval[1]] Bill [iexc[1]]
AGREE!

Thematic Hierarchy: [sco] > [res] > [exc] > …

If these representations are correct, they suggest that [isco], [ires], [iexc] should correspond to θ-relations in semantic representation. There should be counterpart argument separation for quantification:

(42) a. EVERY(X , Y)
  b. P(e) & θ_{SCOPE}(e, X) & θ_{RESTR}(e, Y)
  c. P(e) & θ_{SCOPE}(e, X) & θ_{RESTR}(e, Y) & θ_{EXCP}(e, Y)

3.0 Motivating Argument Separation II

We noted earlier that arg-separation seems inappropriate for Q-relations. E.g., *every* directly compares membership of sets Y and X (43a). Arg-separation appears to sever this connection (43b).

(43) a. **EVERY**(X , Y)   c. **EVERY**(**s**) & θ_1(**e**, X) & θ_2(**e**, Y)

  b. X   Y   d. X   Y

  {a, b, c, d, f} ⊇ {c, d, f}   {a, b, c, d, f} ←θ_1→ **e** ←θ_2→ {c, d, f}
  X   ?   ?

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But compare nominal and adverbial quantification:

(44) a. Everyone who sneezed left.
  b. Always if John sneezes, Mary leaves.

(45) a. {y: sneezes (y)} ⊇ {x: left(x)}
  b. {e: leaving(e) & Ag(e,**m**)} ⊇ {e': sneezing(e) & Ag(e,**j**)} X

Davidsonian events are **thematically unique**; a given event can have at most one agent, one theme, one goal, etc. This means no event of Mary leaving can also be an event of John's sneezing. The first set <u>cannot</u> <u>contain</u> <u>the</u> <u>second</u>.
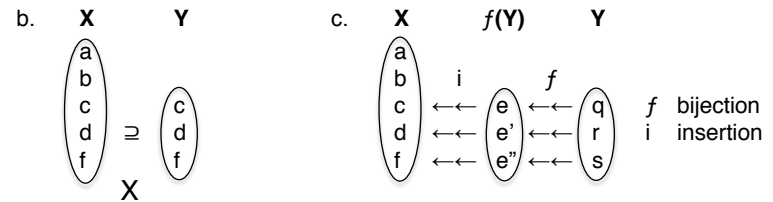
This result is general for adverbial Qs understood as quantifying over events.

(46) a. If it snows, I usually stay inside.
  b. MOST(X,Y) iff I Y ∩ X I > I Y – X I
  c. I {e': Snowing(e')} ∩ {e: Stay-inside(e) & Th(e,**i**)} I >
    I {e': Snowing(e')} – {e: Stay-inside(e) & Th(e,**i**)} I   X

How is this point accommodated? Consider Herburger (2000):

(47) a. [most e: C(e) & [∀e': C(e') & **One-to-one(e,e')**] Snowing(e')]
      Stay-inside(e) & Theme(e,I)
  b. 'Most events where every one-to-one related event is a snowing are such
    that I stay inside'
  c. I f({e': Snowing(e')}) ∩ {e: Stay-inside(e) & Th(e,**i**)} I >
    I f({e': Snowing(e')}) – {e: Stay-inside(e) & Th(e,**i**)} I

(48) a. **ALWAYS**(X , Y)

  b. X   Y   c. X f(Y)   Y

  {a, b, c, d, f} ⊇ {c, d, f}   {a, b, c, d, f} ←← {e, e', e"} ←← {q, r, s} f bijection
  X   i f i insertion

Adverbial Qs thus present a situation <u>opposite</u> to nominal Qs: we precisely <u>can't</u> compare sets Y and X directly. Comparison of X must be to a subset f(Y) that is the one-to-one image of Y.

4.0 Executing Argument Separation

4.1 A Temptation

It's tempting to look to verbal constructions like (49a) in attempting to "neo-Davidsonianize" quantification:

(49) a. This set of choices **exhausts/subsumes/includes** our range of options.
    b. $\{x: option(x)\} \subseteq \{x: choice(x)\}$
    c. **EVERY**(X,Y) iff $Y \subseteq X$ (i.e., iff $|Y - X| = 0$)

(50) $\exists e$ [**exhaust/subsume/include**(e) & $\theta_1(e, X)$ & $\theta_2(e, Y)$]

This would appeal to a primitive, verbalized counterpart of the subset relation to explicate universal quantification. But**:**

(51) $A \subseteq B$ **=def** $\forall x[\, x \in A \longrightarrow x \in B]$

How can the subset relation explicate universal quantification when subset is itself <u>defined</u> in terms of universal quantification?

4.2 Quantizing e

Neo-Davidsonian representation (52c) separates the individuals (X,Y) involved in quantification, relating them to e but not to each other. How can we capture the equivalent of (52) – how can we relate the two in the way quantification requires?

(52) a. **EVERY**(X , Y) c. **EVERY**(e) & $\theta_1(e, X)$ & $\theta_2(e, Y)$

     c.   **X**   **Y**   d.   **X**   **e**   **Y**
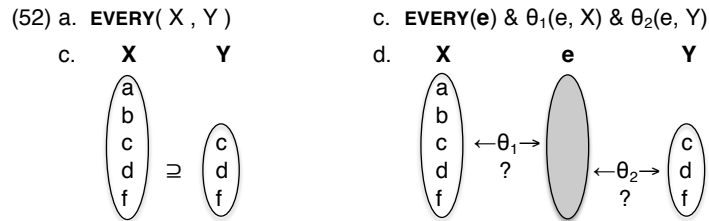
**Idea**: Take the adverbial situation as basic and attempt to generalize from that.

Tentative proposal: X and Y are related via the **structure of e**.

(53) a. Assume e has mereological structure.
    b. $\theta_{RESTR}(e, Y)$ iff $\exists f$ a bijection from $Y \rightarrow e$.

(54) a.   **e**   **Y**   b.   **X**   **e**   **Y**

(55) a.   **X**   **e**   **Y**   b.   **X**   **e**   **Y**
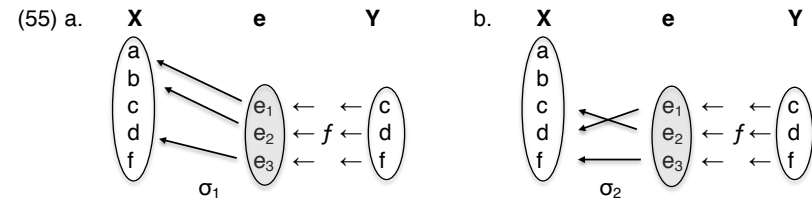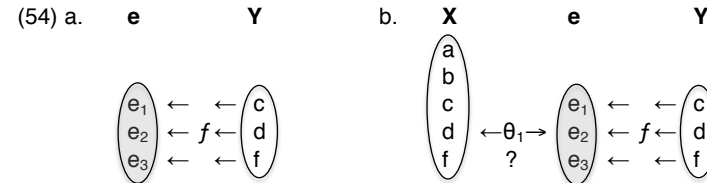
Injections σ from e to X (i.e., functions from e onto X)

Note that iff $Y \subseteq X$, there will be an injection σ from e to X that, when composed with f, is an insertion:

(56) a.   **X**   **e**   **Y**   b.   **X**   **e**   **Y**

       σ_3 $\sigma_3 \circ f(x) = x$
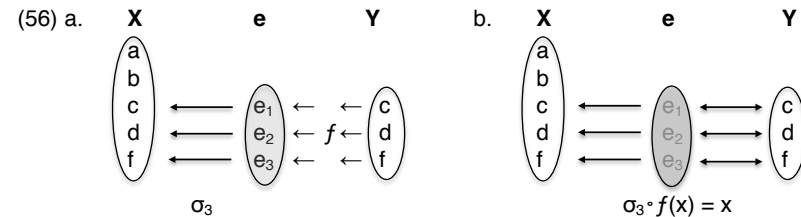
(57) a. $\theta_{A\forall}(e, X)$ iff $\exists \sigma$ an insertion from e to X.
    b. $\theta_{D\forall}(e, X)$ iff $\exists \sigma$ an injection from e to X such that $\sigma \circ f$ is an insertion.

Under this picture:

- θ_{RESTR} "injects" the structure of ⟦NP⟧ into e, the Q-state.
(i.e., the Q-state = the states of those individuals)

- Individual quantifiers represent θ-relations of e to ⟦*Pro*⟧.
D spells out the "subject" θ-role for DP

(58) a. Everyone who sneezed left.
    b. $\exists e[\theta_{D\forall}(e, ⟦\mathit{left}⟧)$ & $\theta_{RESTR}(e, ⟦\mathit{sneezed}⟧)$]

(59) a. Always if John sneezes, Mary leaves.
    b. $\exists e[\theta_{A\forall}(e, ⟦\mathit{Mary\ leaves}⟧)$ & $\theta_{RESTR}(e, ⟦\mathit{John\ sneezes}⟧)$]

Similar propsals will work for other Qs:

(57) a. $\theta_{A\exists}$(e, X) iff $\exists$ σ an injection from e to X such that for some x, σ(x) = x.
    b. $\theta_{D\exists}$(e, X) iff $\exists$ σ an injection from e to X such that for some x, $\sigma \circ f$(x) = x.

(58) $\theta_{D\neg}$(e, X) iff for no σ injection from e to X, $\sigma \circ f$(x) = x, for some x.

4.3 Wider Perspectives

■ Krifka (1989;1999) offers an analysis of telicity in which the theme of a telic predicate is homomorphically injected into the verbal event. Boundness/unboundedness in the former yields boundness/unboundedness in the latter.

   θ_{RESTR} appears suspiciously similar to Krifka's **incremental theme** relation (although making no use of mereological structure for sortal Ns).

■ Davidson (1967a) argues that a great many sentences are underlying event quantifications. It would thus not be surprising to find that the event analysis of quantifiers underlies the event analysis of familiar, verbal predication.
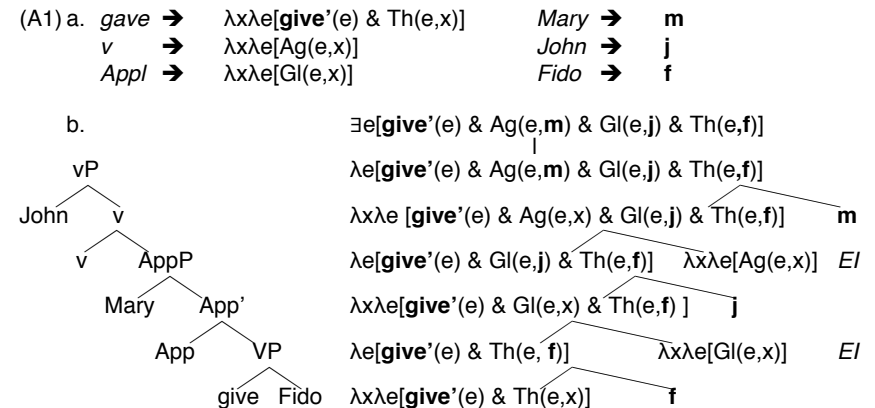
5.0 Summary

■ Neo-Davidsonian analysis of relational Vs appears extensible to lexical As, Ps and Ns without major complications.
■ What about to non-lexical cats – specifically, to relational Ds?
■ **Q1**: Is there motivation for positing quantificational states?
   Q2: Is there motivation for arg-separation?
   Q3: How could arg-separation be executed semantically?
■ If causation & perception involve relations to eventualities, and if adverbial Qs quantify over eventualities, quantificational states seem to be motivated (Q1).
■ If we wish to implement θ-roles as θ-features and appeal to these in the projection of non-lexical cats (D, Q), then arg-separation seems required to give semantic substance to the notion "interpretatable θ-feature for D/Q" (Q2)
■ Adverbial quantification already suggests a semantics in which the set arguments are related through an intermediate set of events (Q2)
■ We explored (briefly and tentatively) potential semantics for quantifier θ-roles that involve mapping through an intermediate event domain (Q3)
■ Although history proceeded the other way, the resulting picture suggests the tantalizing possibility that quantificational θ-relations are actually more basic than verbal ones - that V is analogous to D, rather than the contrary.

References

Barwise, Jon and John Perry (1985) *Situations and attitudes*. Cambridge, MA: MIT Press.
Davidson, D. (1967a) "Causal relations," *Journal of Philosophy 64*: 691-703.
Herburger, Elena (2000) *On what counts*. Cambridge, MA: MIT Press
Higginbotham, J. (1983). The logic of perceptual reports: an extensional alternative to situation semantics. *Journal of Philosophy 80:* 100-127.
Hornstein, Norbert (1999) "Movement and control," *Linguistic Inquiry 30*: 69-96.
Johnston, M. (1994) The syntax and semantics of adverbial adjuncts. Ph.D. Thesis, UCSC.
Krifka, Manfred (1989) "Nominal reference and temporal constitution," in R. Bartsh et al. (eds.) *Semantics and contextual expression*. (pp. 75–115) Dordrecht: Foris.
Krifka, Manfred (1993) "Thematic relations as links between nominal reference and temporal constitution," in Ivan Sag and Anna Szabolsci (eds.) *Lexical matters*. (pp. 29–53) Stanford, CA: Stanford University Press.
Krifka, Manfred (1999) "The origins of telicity," in Susuan Rothstein (ed.) *Events and grammar*. (pp. 197-235) Dordrecht: Kluwer Academic Publishers.
Larson (1991) "The projection of DP (and DegP)" reprinted in Larson (2104).
Larson, Richard (2014) *On shell structure*. London: Routledge.
Parsons, Terence (1991) *Events in the semantics of English*. Cambridge, MA: MIT Press.
Pesetsky, David and Esther Torrego. (2007) "The syntax of valuation and the interpretability of features". In Simin Karimi, Vida Samiian and Wendy K. Wilkins (eds.)*Phrasal and clausal architecture: Syntactic derivation and interpretation*. (pp. 262–294) Amsterdam: Benjamins.
Vlach, Frank (1983). On situation semantics for perception. *Synthese 54*: 129-152.

Appendix: The K/P Analysis ("K/P" for "Kratzer/Pylkkanen")

(A1) a. *gave* ➔ $\lambda x\lambda e[\textbf{give'}(e)$ & Th(e,x)]   *Mary* ➔ **m**
     v ➔ $\lambda x\lambda e[Ag(e,x)]$ *John* ➔ **j**
     Appl ➔ $\lambda x\lambda e[Gl(e,x)]$ *Fido* ➔ **f**

b.
$\exists e[\textbf{give'}(e)$ & Ag(e,**m**) & Gl(e,**j**) & Th(e,**f**)]

vP $\lambda e[\textbf{give'}(e)$ & Ag(e,**m**) & Gl(e,**j**) & Th(e,**f**)]

John v $\lambda x\lambda e$ [**give'**(e) & Ag(e,x) & Gl(e,**j**) & Th(e,**f**)]   **m**

  v   AppP $\lambda e[\textbf{give'}(e)$ & Gl(e,**j**) & Th(e,**f**)] $\lambda x\lambda e[Ag(e,x)]$ *EI*

    Mary   App' $\lambda x\lambda e[\textbf{give'}(e)$ & Gl(e,x) & Th(e,**f**)]   **j**

     App   VP $\lambda e[\textbf{give'}(e)$ & Th(e, **f**)] $\lambda x\lambda e[Gl(e,x)]$ *EI*

       give Fido $\lambda x\lambda e[\textbf{give'}(e)$ & Th(e,x)]   **f**

K/P requires a stipulative operation of "Event Identification" (EI) to allow the interpretations of App and v to combine properly.
K/P is thus dispreferred in comparison to K and P (Larson 2014).