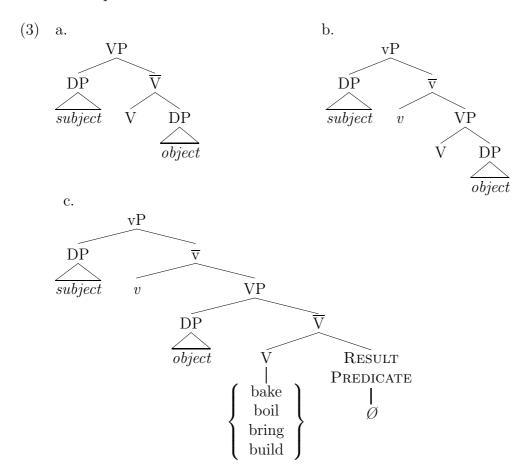# States, events and VP structure:
evidence from purposive adjuncts

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Preamble. How much structure is there inside a VP?
To what extent does semantically complex event structure map onto articulated syntactic structures?

(1)   Max boiled some potatoes.

(2)   • Max is the agent of a volitional act.
      • There is an event of some potatoes boiling.
      • The potatoes are cooked.

(3)   a.

```
            VP
         /      \
       DP        V̄
      /\        /  \
  subject      V    DP
                   /\
                 object
```

b.

```
            vP
         /      \
       DP        v̄
      /\        /  \
  subject      v    VP
                   /   \
                  V     DP
                       /\
                     object
```

c.

```
            vP
         /      \
       DP        v̄
      /\        /    \
  subject      v      VP
                   /        \
                 DP          V̄
                /\          /   \
            object         V    RESULT
                           |    PREDICATE
                        { bake       |
                          boil       Ø
                          bring
                          build }
```

Claim: Verb phrases whose meanings include result states have representations like (3c).

In particular, there is a constituent (often phonetically empty) that denotes a result-state description. This constituent can be detected by means of an optional modifying adjunct.

(4)   Max ⎰ baked a chocolate cake ⎱ (for me to admire).
          ⎱ boiled some potatoes ⎰
            brought his cat
            built that house

1. Two puzzles concerning purposive adjunct clauses

- There are two varieties of purposive VP adjuncts, with distinctive properties.
  [See Faraci 1974, Huettner 1989, Jones 1985.]

  ⇒ **Purpose clauses** are VP-internal, containing a gap bound to the matrix object.

  (5)   a. Max brought <u>his cat$_2$</u> here [for me to admire $\_\_{}_2$]   **Purpose clauses**
         b. <u>His cat$_2$</u> was brought t_2 here [for me to admire $\_\_{}_2$]
         c. Max brought <u>his cat$_2$</u> here [$\_\_{}_2$ to sniff me]

  ⇒ **Rationale clauses** are external to the VP, and are not dependent on the matrix objeect.

  (6)   a. Max brought his cat here [(in order) for me to admire it]   **Rationale clauses**
         b. Max brought his cat here [(in order) for me to cheer up]

A useful diagnostic: Purpose clauses are incompatible with "in order".

  (7)   a. Max brought <u>his cat$_2$</u> here [**(*in order)** for me to admire $\_\_{}_2$]
         b. Max brought <u>his cat$_2$</u> here [**(*in order)** $\_\_{}_2$ to sniff me]
         c. <u>Max$_1$</u> brought his cat$_2$ here [(in order) $\_\_{}_1$ to annoy me]

- Purpose clauses *must* have a gap. In contrast, the only allowable gap in a Rationale Clause
is PRO controlled by the matrix subject.

Puzzle One:

Why should the presence–vs.–absence of a gap correlate with low–vs.–high attachment?

- Purpose Clauses and Rationale Clauses also differ—sometimes quite subtly—in meaning.

  (8)   a. Someone left these leaves here [for me to rake $\_\_$]   **PC:** *nothing entailed about subject's intent*

         b. Someone left these leave here [for me to rake them]   **RC:** *expresses the subject's intention*

  (9)   a. The patient is here [for the doctor to see $\_\_$]   **PC***: nothing entailed about patient's intent*

         b. The patient is here [for the doctor to see him]   **RC***: entails patient intends to be seen*

Puzzle Two:

What is the exact nature of the meaning difference, and why does it correlate with the presence–vs.–absence of a gap?
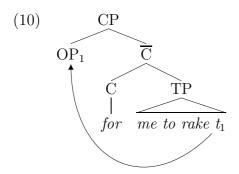

- **Goal of the talk:**
To show that there's no essential difference between the two types of purposive adjunct.
The observed differences reduce to differences in attachment site, given the hypothesized
structure of the VP, together with some assumptions about the meanings of the pieces.

2.   The syntax of infinitival adjuncts

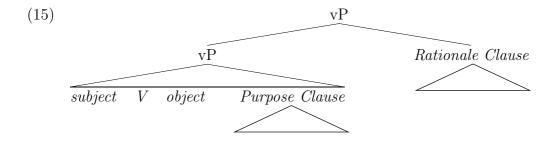### 2.1.   Purpose clauses as 'Null Operator Constructions'

- The object-dependent gap in a Purpose clause arises through operator movement. [Chomsky 1977, Browning 1987]

(10)

- Internally, then, PCs have the syntax of infinitival relative clauses, but modify some constituent other than a NP.

(11)   a. Here are [some leaves [OP for you to rake t]]   *Infinitival relatives*
     b. [Some leaves [OP for you to rake t]] are right here

(12)   I left them (right here) [OP for you to rake t]   *Purpose clause*

(13)   [Someone [OP t to rake the leaves]] is right here   *Infinitival relative*

(14)   I invited him over [OP t to rake the leaves]   *Purpose clause*

2.2.   Low vs. high attachment—Evidence for the correlation

Purpose clauses are always attached lower than Rationale clauses.
(Faraci 1974, Huettner 1989)

(15)

§ *Control*

(16)   a.   <u>They</u>$_1$ brought Max$_2$ along [(in order) PRO$_1$ to amuse themselves]

   b.   They$_1$ brought <u>Max</u>$_2$ along [(*in order) OP_2 t_2 to talk about himself]

(17)   They brought Max along [OP PRO to introduce {themselves$_1$/*himself$_2$} to t]

§ *Relative ordering*

(18)   a.   They brought Max along [＿ to talk to himself] [(in order) ＿ to amuse themselves]

   b.   * [(in order) ＿ to amuse themselves] [＿ to talk to himself]

(19)   a.   George put that gun on the table [for me to shoot him with ＿] [in order to prove I'm a coward]

   b.   * George put that gun on the table [in order to prove I'm a coward] [for me to shoot him with ＿]

§ *VP-fronting*

(20)   a.   * I said I'd invite Max over… and [invite Max over] I did ＿ [for you to talk to ＿]

   b.   I said I'd invite Max over… and [invite Max over] I did ＿ [for you to talk to him]

(21)   a.   * I said I'd invite Max over… and [invite Max over] I did ＿ [＿ to talk about himself]

   b.   I said I'd invite Max over… and [invite Max over] I did ＿ [＿ to amuse myself]

• **Given these assumptions, the two puzzles can be restated in a somewhat more precise way.**

   ⇒ **Puzzle one:** Why is null operator movement <u>obligatory</u> in a VP-internal infintival adjunct? And why is it <u>impossible</u> in a VP-external adjunct?

   ⇒ **Puzzle two:** How and why exactly does the meaning of an infinitival adjunct change depending on whether it is VP internal or VP-external?

3. Getting at the differences (and similarities) in meaning

- **The meanings of purposive adjuncts are modal.**
  (They express something about purposes/goals/designs/intent.)

  (22) a. Max built that house for his kids to inherit __]   *Purpose clause*
        b. Max built that house for his kids to inherit it   *Rationale clause*

  (23) a. Mary put these papers on the desk [for you to sign __]   *Purpose clause*
        b. Mary put these papers on the desk [for you to sign them]   *Rationale clause*

  (24) a. Someone left these leaves here [for me to rake __]   *Purpose clause*
        b. Someone left these leave here [for me to rake them]   *Rationale clause*

  (25) a.   Phoebe was brought into our lives [for us to love __]   *Purpose clause*
        b. # Phoebe was brought into our lives [for us to love her]   *Rationale clause*

- **What is the nature of the difference in entailments about the agent's intention?**

  ◇ Rationale clauses express the intended purpose of an action (by the actor)
  ◇ Purpose clauses can express a more abstract intention—not necessarily that of an agent

   ⇒ ***An abstract desire or aim that pertains to a result state?***

- **Purpose clauses are compatible with a restricted class of predicate types**
  (Faraci 1974, Bach 1982, Jones 1985)

  (26) a.   I bought that convertible for you to admire   *change of state*
        b. # I drove that convertible for you to admire   *non-change of state*

        c. *cf.* I drove that convertible in order for you to admire me

  (27) a.   I planted that tree for my kids to play on   *'positive' change*
        b. # I chopped it down to prevent my kids from playing on   *'negative' change*

        c.   I chopped it down to use as firewood   *a pragmatic difference?*

- *Huettner's (1989) intuition:*

Purposive infinitivals all have a common basic meaning, and the differences between them result from their external syntactic environment.

- Specific aspects of this basic intuition that I'd like to explore:

  ⇒ vPs describe actions, and *Rationale clauses* are understood as describing the agent's intended purpose in carrying out the action.

    – **Agentive events:** goal-directed (they are understood as having inherent goals)

  ⇒ Some verbs evoke result states as part of their meanings, and *Purpose clauses express something about goals/intentions that relate to these states* (rather than to the events that cause them).

    – **States:** no goals are inherently associated with them.

  ⇒ The reason that the meanings differ only subtly in many cases (and are sometimes indistinguishable) is that when the result state is taken to be the direct, intended consequence of an action, the most salient goal that can be expressed about the result state is simply the one held by the agent of the causing event.

A crude semantics for purposive infinitivals

- Purposive infinitivals express goals/intentions/desires.

  ⇒ *for Ned to talk to me* means, essentially, that it is desired that Ned talk to me.

- **Statements of desire involve restricted quantification over possible worlds** (Hintikka 1969, Kratzer 1981; see also Huitink 2005, Nissenbaum 2005a, 2005b)

(28) Note about semantic types (and conventions I will adopt for naming variables):
  - Variables named 'e' range over situations/events/states/possible worlds (type s)
  - Those named 's' will be limited to states; 'w' to possible worlds
  - Functional types and variables:
      'P' ranges over functions of type $\langle e, st \rangle$; 'p' ranges over type $\langle s, t \rangle$

(29) **The meaning of a *for*-infinitival adjunct clause:**

  ⟦for Ned to talk to me⟧ $= \lambda e.$[Ned talks to me in every possible world w that is compatible with the goals/intentions/desires relevant to e]

(30) **The meaning of a *for*-infinitival adjunct clause *with null operator movement:***

  ⟦O$_i$ for Ned to talk to t_i⟧ $= \lambda \boldsymbol{x} \lambda e.$[Ned talks to $\boldsymbol{x}$ in every possible world w that is compatible with the goals (etc.) relevant to e]

- **In short:**

  ⇒ A plain infinitival adjunct (like a Rationale clause) is a function of type $\langle s, t \rangle$, and expresses a salient purpose related to the 'world (event, etc.) of evaluation'.

  ⇒ A purpose clause is just the same thing with a gap, that is, a property of type $\langle e, st \rangle$.
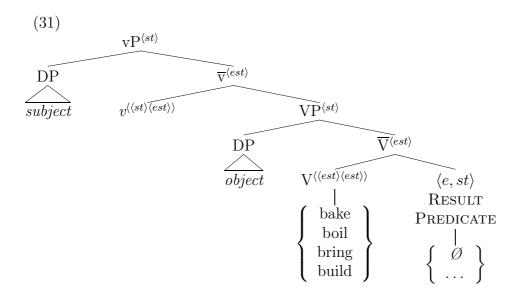
4. A joint solution to both puzzles

- To begin with, we can now restate the two puzzles, now in minimally more precise terms.

  ⇒ **Puzzle one:** Why must a VP-internal infintival adjunct have semantic type $\langle e,st \rangle$? And why a VP-external adjunct have type $\langle s,t \rangle$?

  ⇒ **Puzzle two:** Why does a VP-external purposive adjunct necessarily express the intentions of the agent? Why do we get precisely the pattern of entailments we get with VP-internal purposive adjuncts?
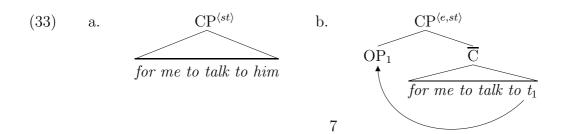
- **Conjecture:**

The change of state verbs that support Purpose Clauses select a complement of **type $\langle e,st \rangle$**, which (like any XP) *can be modified by an adjunct **of the same type***.

    Adjuncts that modify this complement will necessarily have operator movement.

Moreover, if it's correct that XP-adjunction isn't permitted to non-maximal projections [Chomsky 1986, 2000], we have an explanation for why Rationale clauses *can't* have null operator movement—**the semantic type can only be $\langle s,t \rangle$**.

(31)

(32) Some items from the lexicon:

a. $[\![_{\text{RESULTPRED}} \textbf{here}]\!] = \lambda x \lambda e.[\text{e is the state of x being here}]$

b. $[\![\text{bring}]\!] = \lambda P_{\langle e,st \rangle} \lambda x \lambda e.\text{event(e)} \ \& \ \text{bringing(x)(e)} \ \& \ \exists s[P(x)(s) \ \& \ \text{CAUSE}(s)(e)]$

c. $[\![v]\!] = \lambda p_{\langle st \rangle} \lambda x \lambda e.\text{event(e)} \ \& \ \text{agent(e)(x)} \ \& \ \exists e'[\text{CAUSE}(e')(e) \ \& \ p(e')]$
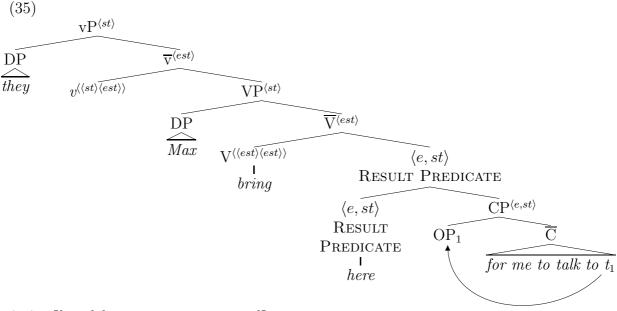
(33)   a.

    b.

- **The meaning differences will follow as well — once we take into account that *agentive events* (as opposed to states) are goal-directed.**

  - The goals relevant to an agentive event are simply those held by its agent.

  - Determining which goals are relevant to a state is a more flexible matter.

If a purposive adjunct (like (33b)) modifies the RESULT PREDICATE node, in a sentence like

(34)   They brought Max here $[O_i$ for me to talk to $t_i]$

it will be interpreted as expressing some purpose that relates (in some contextually determined way) to the result state of Max's being here.
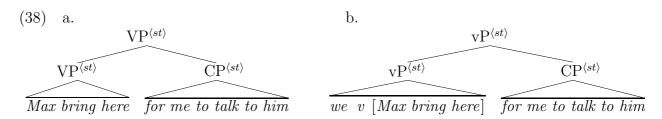
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(35)

(36) $[\![$[here] $[O_i$ for me to talk to $t_i]]\!] =$

                                      (by (32a), (30), and PREDICATE MODIFICATION)

    $\lambda x \lambda e.[e$ is the state of x being here, and I talk to x in every possible world w
        that is compatible with goals/intentions/desires relevant to e]

$\Rightarrow$ On the other hand, if a purposive adjunct (like (33a)) is adjoined *to any XP above that node*, as in

(37)   They brought Max here [for me to talk to him]

it can only be construed as expressing a purpose related to the *causing event*—
i.e., the agent's purpose.

---

(38)   a.   b.

(39) $[\![[_{VP}$ Max bring here] [for me to talk to him]$]\!]$ =

<div align="right">(by (32a,b), (29), and PREDICATE MODIFICATION)</div>

$\lambda\boldsymbol{e}.$[event(e) & bringing(Max)(e) & $\exists s$[s is the state of Max being here & CAUSE(s)(e)],
   and
  I talk to *him* in every w compatible with the goals (etc.) relevant to $\boldsymbol{e}$]

(40) $[\![[_{vP}$ they bring Max here] [for me to talk to him]$]\!]$ =

<div align="right">(by (32a,b,c), (29), and PREDICATE MODIFICATION)</div>

$\lambda\boldsymbol{e}.$event(e) & agent(e)(they) &
  $\exists e'$[CAUSE(e')(e) & event(e') & bringing(Max)(e') & $\exists s$[s is the state of Max being here & CAUSE(s)(e')]],
     and
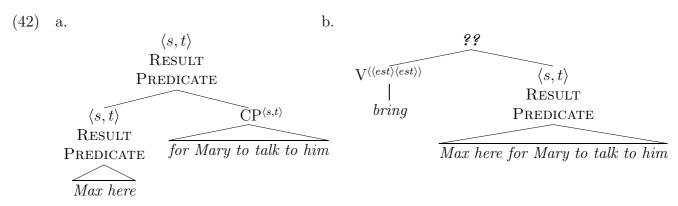 I talk to *him* in every w compatible with the goals (etc.) relevant to $\boldsymbol{e}$]

- **Impossible:**
  A gapless modifier of the Result Predicate

A sentence like *We brought Max here for Mary to talk to him* can never get a parse that includes a constituent like (41), because of the type mismatch:

(41)

The type mismatch can't be overcome by means of the gapless adjunct modifying a small clause as in (42a). Why?

(42) a.   b.

... It follows from the thesis that the relevant verbs select properties, not small clauses (42b).

> $\Rightarrow$ **Purposive infinitivals without gaps can only be parsed in construction with a higher part of the VP than the result predicate. Consequently they can only be interpreted as being related to a causing event, not the result state.**
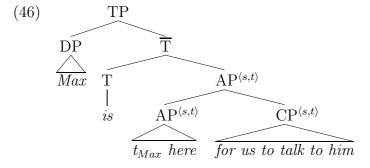
5. A remaining problem: Stative Predicates

While this approach to the differences between PCs and RCs explains the patterns of entailments (about agentive intentions) in agentive sentences like (43):

(43)   They brought Max here [for us to talk to (him)]

... it does not explain why the same pattern holds in stative sentences like (44) and (45):

(44)   a. Max is here [for us to talk to ‗]
       b. Max is here [for us to talk to **him**]

(45)   a. Someone left these leaves here [for me to rake ‗]
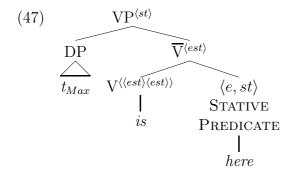   b. Someone left these leaves here [for me to rake **them**]

The gapless adjuncts in the (*b*) sentences above attribute agentive intentions, respectively, to *Max* and *someone*.

But these sentences involve plain stative predicates. Why can't the gapless adjuncts in these examples express goals relevant to the states described by constituents like [Max here], as in the following structure:
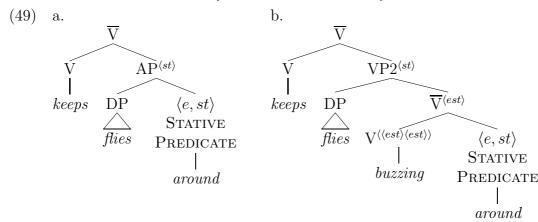
(46)

Suggestion:

⇒ **There is no such constituent in a stative sentence.**

⇒ Instead, stative predicates combine with eventive *be* (Rothstein 1999), hence are not saturated in their maximal projections.
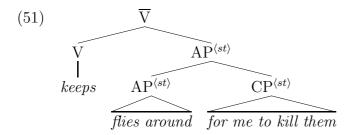
(47)

10

While Rothstein argued that there are no small clauses embedded in stative sentences, she identified some environments in which stative small clauses *are* found.

(48) a. My shampoo keeps [$_{AP}$ flies around]
      b. My shampoo keeps [$_{VP}$ flies buzzing around]

(49) a.   b.

$$\overline{V}$$

a.
```
        V̄
       /  \
      V    AP⟨st⟩
      |    /    \
    keeps DP   ⟨e,st⟩
          △    STATIVE
        flies  PREDICATE
                 |
               around
```

b.
```
        V̄
       /   \
      V     VP2⟨st⟩
      |     /     \
    keeps  DP    V̄⟨est⟩
           △     /      \
         flies  V⟨⟨est⟩⟨est⟩⟩  ⟨e,st⟩
                  |         STATIVE
               buzzing      PREDICATE
                              |
                            around
```

> **Surprisingly, a gapless purpose clause turns out to be possible in the environment that Rothstein identified as a true stative small clause:**

(50) a.   My shampoo keeps flies around [for me to kill (them)]
      b. # My shampoo keeps flies buzzing around [for me to kill them]

⇒ (50a) can express a desire not held by an agent of any causing event.

(51)
```
            V̄
          /    \
         V      AP⟨st⟩
         |      /      \
       keeps  AP⟨st⟩   CP⟨st⟩
              /‾‾‾\    /‾‾‾‾‾‾‾\
         flies around  for me to kill them
```

Compare with a non-small-clause selecting counterpart:

(52)   # My shampoo **brings** flies around for me to kill them
       ⇒ *Seems to imply that the shampoo intends for me to kill the flies*
       ⇒ [flies] is an argument of *brings*, not an argument of *around*.

As expected, the deviant examples become good if the adjuncts contain gaps:

(53)   My shampoo **brings** flies around [for me to kill ⎯]
(54)   My shampoo **keeps** flies **buzzing** around [for me to kill ⎯]

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6. Conclusions

- A Purposive infinitival adjunct is modal expression of desire. It denotes a relation between the aim that it expresses and the situation/eventuality that it holds of.

- States and agentive events differ:
  - ⇒ Events have inherent aims associated with them (they are goal-directed).
  - ⇒ States don't. So "the aims relevant to" a state can, but need not, refer to aims held by a participant in the chain of events bringing the state about.

- Purposive adjuncts provide a useful tool for diagnosing structure inside the VP.
  - ⇒ VPs whose meanings involve events that cause result states have highly articulated structural representations, with each layer describing a component of the event structure.
  - ⇒ Verb roots that select result-state predicates need to take properties as their arguments, not (small clause) propositions. Copular [be] is like this, too (à la Rothstein).

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