A Little Bit on Adverbs and Events [1]

1. From Adjectives to Adverbs to Events

We've just developed a theory of the semantics of adjectives, under which they denote either functions of type <et> or of type <et,et>.

(1) **The Lexical Semantics of Intersective and Subsective Adjectives**

     a.   <u>Intersective Adjectives (Type <et>):</u>   [[male]]   =   [λx_e : <u>x is male</u>]

     b.   <u>Subsective Adjectives (Type <et,et>):</u>
               [[young]]   =   [$\lambda f_{<et>}$: [λx_e : <u>f(x) = T and</u>
                                              <u>x is below the average age for { y : f(y) = T }]</u>

Of course, adjectives aren't the only kind of modifier in natural language…
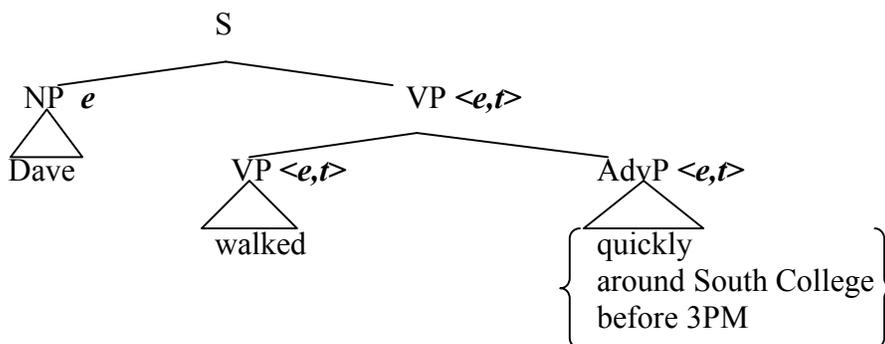   There are also **adverbs**, which modify VPs…

(2) **Adverbial Modifiers**

     a.   [Dave [walked **quickly**]]
     b.   [Dave [walked **around South College**]]
     c.   [Dave [walked **before 3PM**]]

---

(3) **Initial Observation**
     If we assume adverbs to also be of type <et>, then we could interpret sentences like those in (2) via Predicate Modification.

---

(4)   **Immediate Question:**   What should be the <e,t> denotation of these adverbs?

        a.   [[quickly]]   =   [λx_e : <u>x is quick</u>]

        b.   [[around South College]]   =   [λx_e : <u>x is around South College</u>]

        c.   [[before 3PM]]   =   [λx_e : <u>x is before 3PM</u>]

(5)   **Immediate Problem:**

If we assume the lexical entries in (4), then interpreting the structure in (3) via PM will yield truth-conditions that *don't sound quite right*.

        a.   [[Dave walked **quickly**]] = T *iff* Dave walked and Dave is quick.   [not bad]

        b.   [[Dave walked **around South College**]] = T *iff*
                        Dave walked and Dave is around South College.   [erm…]

        c.   [[Dave walked **before 3PM**]] = T *iff*
                        Dave walked and Dave is before 3PM.   [this is insane]

---

(6)   **What's Going Wrong Here? (Davidson 1967)**

- In sentences like those in (2), it isn't *Dave* that is 'quick', 'around South College' or 'before 3PM'.

- Rather, it's **his walking** that is 'quick', 'around South College', 'before 3PM'.

- Or, to put a slightly different spin on it, it's **the event of Dave walking** that is 'quick', 'around South College', 'before 3PM'.

Ever since the work of Davidson (1967), philosophers and linguists have found the following core hypotheses to be extremely productive:

(7)   **Core Hypotheses Behind Event Semantics**

        a.   VPs are predicates of events (a semantic type distinct from entities or t-values)

        b.   Adverbs are also predicates of events

        c.   Adverbs modifying VPs are interpreted via PM (or a similar such rule)

We'll now work towards implementing these core hypotheses using the tools already at our disposal!...

2. Basic Implementation of Event Semantics

(8) **Expanding Our Semantic Types**

- In addition to the types e and t, we will have the type ε, for events.
- Consequently, our domains now also include a set D_ε (the domain of events)

(9) **The Semantics of Adverbs**
As previewed above, we'll view adverbs as denoting predicates of events.

a.	[[quickly]]	=	[λe_ε : <u>e is quick</u>]
b.	[[around South College]]	=	[λe_ε : <u>e is around South College</u>]
c.	[[before 3PM]]	=	[λe_ε : <u>e is before 3PM</u>]

(10) **Problem: The Syntactic Position of the Subject**

- The core ideas in (7a) and (7c) imply that VPs and adverbs are of type $\langle\varepsilon,t\rangle$.
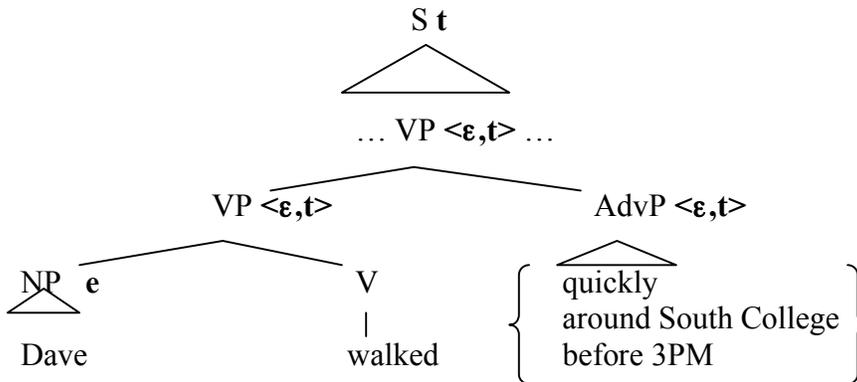- But, if this is the case, *how is the subject combined semantically with the VP?*
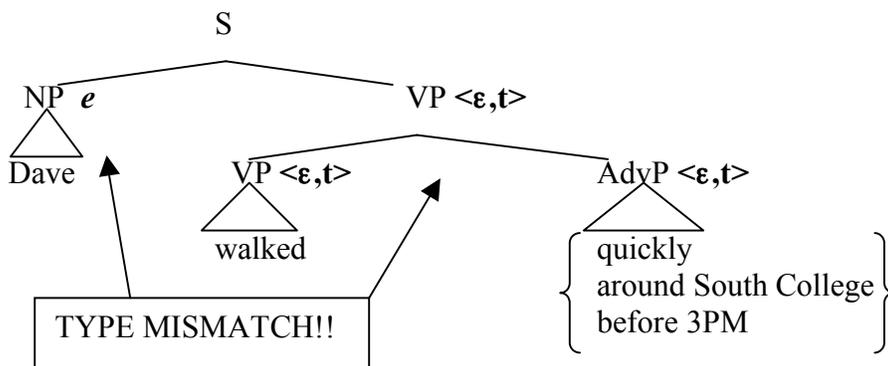
- The proper solution to this problem will not be possible until we've covered the syntax and semantics of *movement structures.*

- For now, however, suspend your disbelief, and accept the provisional (though presently unclear) idea in (11) below.

(11)   **Solution: The VP-Internal Subject Hypothesis**

Although the structure in (10) is the 'pronounced' form of the sentences in (2), when these sentences are semantically interpreted – when their extensions are computed – they are assumed to have the syntactic form below.

<u>Key Property:</u> The subject occupies a position *inside* the VP

S **t**

... VP **<ε,t>** ...

VP **<ε,t>**   AdvP **<ε,t>**

<u>NP</u> **e**   V   quickly
                                            around South College
Dave   walked   before 3PM

(12)   **Key Observation 1:**
In order for the types here to all work out, we have to assume that intransitive verbs like *walked* are of type $<e, <ε,t>>$.

[[walked]]   =   [λx_e : [λe_ε : <u>e is an event of walking and x is the agent of e</u>]]
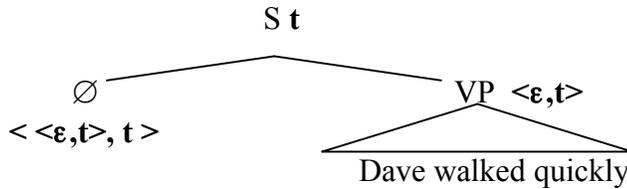
* <u>Note:</u>   The 'agent' of an event is the 'doer', the thing that brings the event about. (Recall your discussion of theta roles in LING 601)

(13)   **Major Semantic Predictions**

a.   [[[$_{VP}$ Dave walked]]] = (by FA)
        [λe_ε : <u>e is an event of walking and Dave is the agent of e</u>]

b.   [[[$_{VP}$ [$_{VP}$ Dave walked] quickly]]] =   (by FA and PM)
        [λe_ε : <u>e is an event of walking and Dave is the agent of e **and e is quick**</u>]

c.   [[[$_{VP}$ [$_{VP}$ Dave walked] before 3PM]]] =   (by FA and PM)
        [λe_ε : <u>e is an event of walking and Dave is the agent of e **and e is before 3PM**</u>]

d.   [[[$_{VP}$ [$_{VP}$ Dave walked] around South College]]] =   (by FA and PM)
        [λe_ε : <u>e is an event of walking and Dave is the agent of e</u>
                                        <u>**and e is around South College**</u>]

(13)   **Key Observation 2**
In order for the types here to all work out, we have to assume that there is *some kind of phonologically null thingy* just below S, which takes the VP as argument and returns a truth-value.

$$\text{S } t$$

```
                S t
          _____|_____
         /             \
        ∅            VP  <ε,t>
    < <ε,t>, t >       /\
                      /  \
              Dave walked quickly
```

- *But what does this phonologically null thingy actually denote?*

- To develop an answer, let's lay out some assumptions regarding the truth-conditions of sentences like the ones in (2).

(14)   **Assumptions Regarding the Truth-Conditions of the Sentences in (2)**

a.   [[∅ Dave walked quickly]] = T *iff*
There is an event e such that e is an event of walking and Dave is the agent of e and e is quick.

b.   [[∅ Dave walked around South College]] = T *iff*
There is an event e such that e is an event of walking and Dave is the agent of e and e is around South College.

c.   [[∅ Dave walked before 3PM]] = T *iff*
There is an event e such that e is an event of walking and Dave is the agent of e and e is before 3PM.

With these truth-conditions, and the assumption that ∅ is of type <<ε,t> t>, we can deduce [[∅]]

(15)   **Deducing the Extension of '∅', Part 1**

- First, by FA, we know that:
[[∅ Dave walked quickly]] = [[∅]]([[Dave walked quickly]])

- Next, by (13b), we know that:
[[∅]]([[Dave walked quickly]]) =
[[∅]]([λe$_ε$: <u>e is an event of walking and Dave is the agent of e and e is quick</u>])

- Next, given our notation, we know that:
There is an event e such that e is an event of walking and Dave is the agent of e and e is quick   *iff*
There is an event e such that [λe$_ε$: <u>e is an event of walking and Dave is the agent of e and e is quick</u>](e) = T

(16)   **Deducing the Extension of '∅', Part 2**

*   Putting together the ingredients in (14) and (15), we know that:

    $[[∅]]([λe_ε:$ <u>e is an event of walking and Dave is the agent of e and e is quick]$)$ = T *iff*

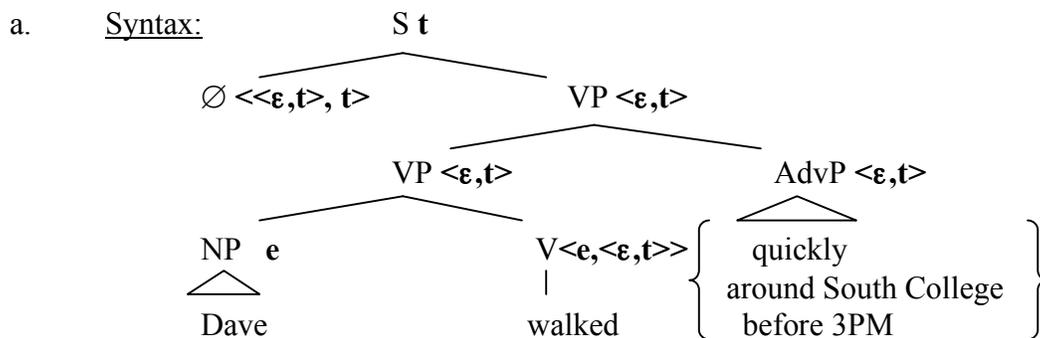   **There is an event e such that** $[λe_ε:$ <u>e is an event of walking and Dave is the agent of e and e is quick](e) = T

*   Thus, $[[∅]]$ denotes a function which takes as argument a predicate of events P, and returns T *iff* there is an event e such that P(e) = T

---

(17)   **The Deduced Semantics**

$$[[∅]] = [λP_{<ε, t>} : \text{there is an event e such that P(e) = T}]$$

---

(18)   **Putting the Pieces Together**

*   In the system we've developed, the sentences in (2) are assumed to have the syntactic structure in (18a).

*   Given the lexical entries in (9), (12), and (17), these sentences are predicted to have the truth-conditions in (18b)

a.   <u>Syntax:</u>

b.   <u>Predicted Truth Conditions:</u>

$[[S]]$ = T *iff*

There is an event e such that e is an event of walking and Dave is the agent of e and e is quick / e is around South College / e is before 3PM.
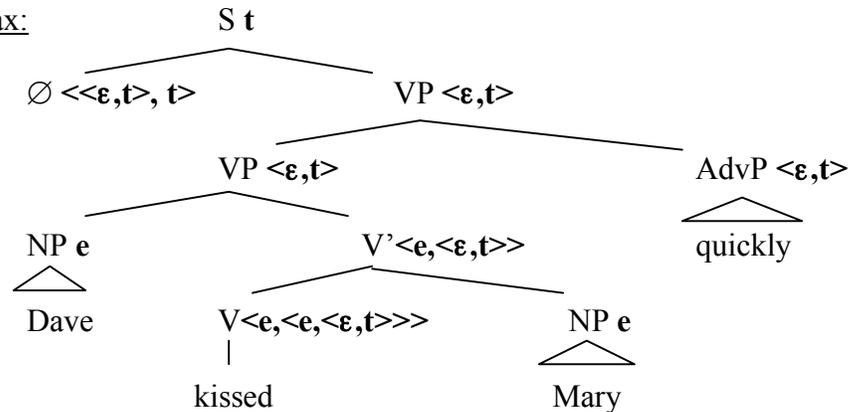
3.   Extending This to Transitive Verbs

Under the regime of ideas above, we would need to assume that transitive sentences like (19a) have the syntax in (19b).

(19)   **Event Semantics and Transitive Verbs: Syntax**

   a.   <u>Sentence:</u>   Dave kissed Mary quickly.

   b.   <u>Syntax:</u>

Consequently, we can deduce that transitive verbs in this system must be of type $<e,<e,<\varepsilon,t>>>$.
   • We can assume that they have a lexical semantics akin to that in (20)

(20)   **Event Semantics and Transitive Verbs: Semantics**

   [[kissed]]   =
   [λy . [λx . [λe . <u>e is an event of kissing and x is the agent of e, and y is the theme of e</u>]]]

   • <u>Note:</u>   The 'theme' of an event is the 'do-ee', the thing affected by the event.
                   (Recall your discussion of theta roles in LING 601)

(21)   **Predicted Truth-Conditions of Transitive Sentences**

   [[(19b)]] = T *iff*

   There is an event e such that e is an event of kissing and Dave is the agent of e and Mary is the theme of e and e is quick.

4.   Severing External Arguments and the Little *v*P

For reasons that you'll learn about in LING 601, there is evidence that transitive verbs like "kiss" are actually of type $<e,<\varepsilon,t>>$, and only take their 'themes' as arguments.

- That is, there is reason to suspect that the lexical entry for 'kiss' should be as in (22)

(22)   **Revised Lexical Semantics for Transitive Verbs**

        [[kissed]]   =   [λy. [λe . <u>e is an event of kissing and y is the theme of e</u>]]]
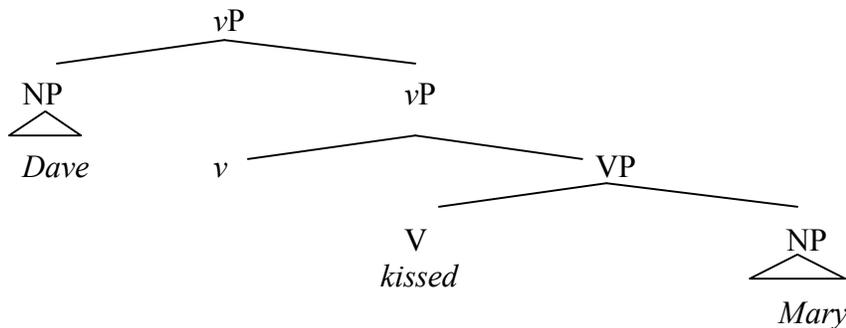
(23)   **Obvious Immediate Question**
        How the heck does a VP like 'kissed Mary' combine semantically with the subject 'Dave' in (19)??

(24)   **The Answer: Little-*v***

    a.   <u>Step 1: Syntactic Assumption</u>
        The VP is dominated by a projection vP ('little vP'). The subject appears in the specifier of 'little'-*v*

    b.   <u>Step 2: Semantic Assumption</u>
        The meaning of the little-*v* head does the work of introducing the 'Agent' role into the semantic representation of the sentence.

        [[*v*]]   =   [$\lambda P_{<\varepsilon, t>}$. [λx. [λe. <u>P(e) = T & x is the agent of e</u>]]]

With these ideas in place, we can now derive the desired event-based semantics for the sentence *Dave kissed Mary.*

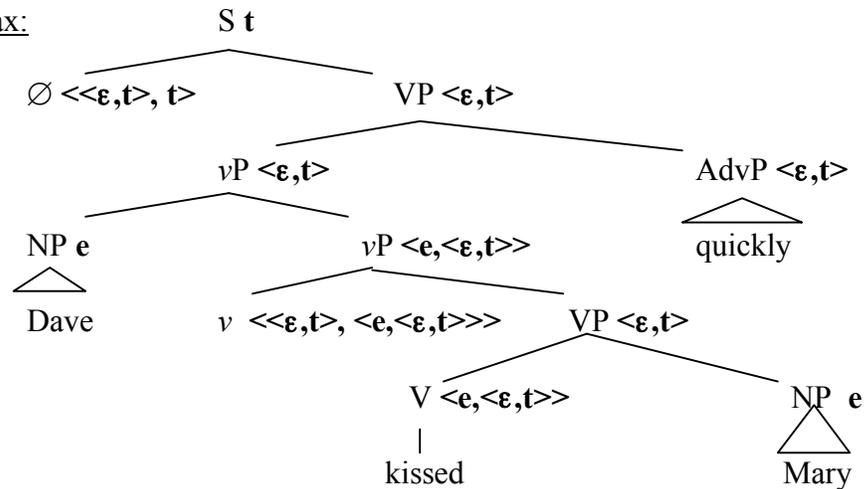---

<u>Side Note:</u>
Under these assumptions, we must also assume that adverbs are modifiers of vP (not VP)

---

(25)   **The Semantics of Transitive Sentences with *v*P**

     a.   <u>Sentence:</u>   Dave kissed Mary quickly.

     b.   <u>Syntax:</u>

     c.   <u>Predicted Truth Conditions:</u>

         [[S]] = T *iff*

         There is an event e such that e is an event of kissing and Mary is the theme of e and Dave is the agent of e and e is quick.

(26)   **Now Forget Everything You've Just Seen**

- As interesting and important as the ideas presented here are, we are going to put them on the 'backburner' for a while.

- **That is, in the immediately following units, we'll revert back to the idea that VPs are of type <e,t> and that transitive verbs directly take the subject as argument.**

- We'll come back to the ideas in this handout towards the end of the course…