PP-Complexes and Shell Structure

Introduction: We provide a binary branching analysis of 'PP-Complexes': PPs which seem to take both DP and PP arguments simultaneously (1). Evidence that the PP-complex is a constituent is given in (2). Superficially similar cases of multiple VP-modification pattern differently (3).

(1)   A bear ambled [PP down [DP the street] [PP toward the beehive]].   (adapted; Jackendoff, 1973)

(2)   a. It was [down the street toward the beehive] that the bear ambled.   (clefting)
       b. [Down the street toward the beehive], a bear ambled.   (topicalization)
       c. [Down the street toward the beehive] ambled a bear.   (locative inversion)

(3)   a.   A bear was ambling down the street with a fish in its mouth.
       b.   * It was [down the street with a fish in its mouth] that the bear was ambling.

And [down the street] does *not* seem to behave like a constituent:

(4)   a.   * It was [down the street] that the bear ambled toward the beehive.
       b.   * [Down the street], a bear ambled toward the beehive.
       c.   * [Down the street] ambled a bear toward the beehive.
       d.   * A black bear ambled down the street toward the beehive and
             a brown bear [VP [VP did so*amble down the street*] [PP toward the fish factory]].

The behavior of PP-complexes poses a puzzle for theories which restrict phrase structure to binary branching (Kayne 1984, 1994; Larson, 1988; Chomsky, 1995 et seq.).

Proposal: Unlike previous ternary-branching analyses (illustrated in (5); Jackendoff, 1973), we use of 'light' categorial heads (as in Larson, 2014; see Svenonius 2007 for light-*p* in particular). Our analysis, shown in (6), still captures the constituency along with other, previously unobserved properties (see below), while maintaining the restrictiveness of binary-branching.

(5)

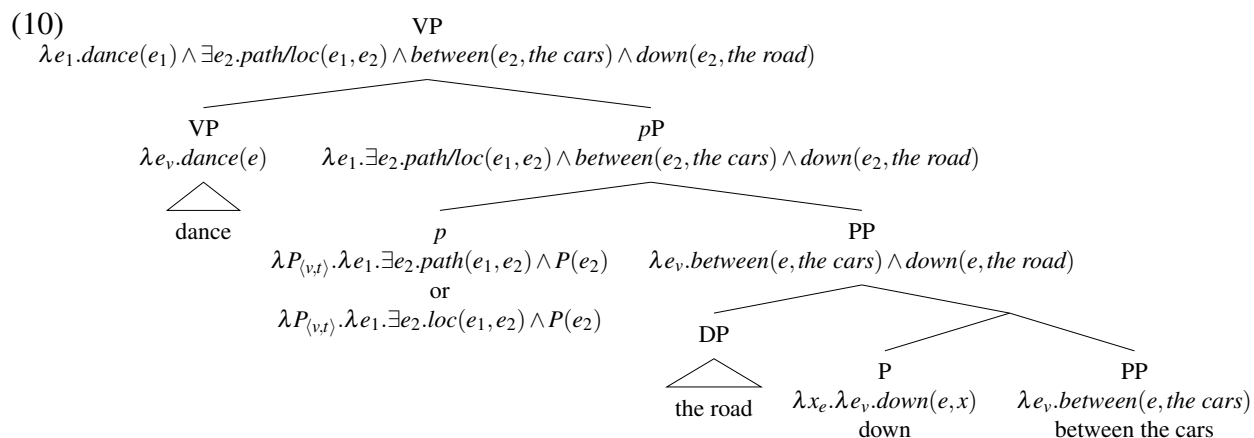(proposal in Jackendoff, 1973)

(6)
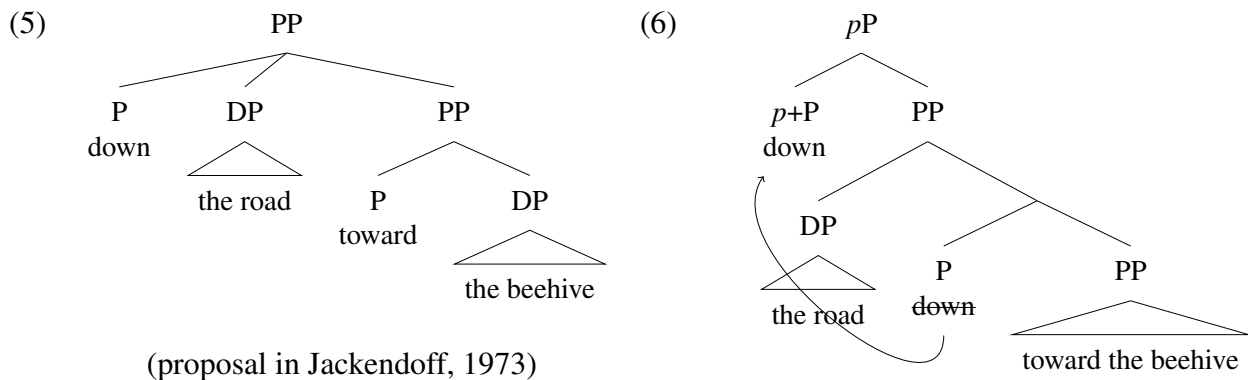
Such an analysis captures the fact that the first DP asymmetrically c-commands the second DP. This c-command relation is shown by quantificational binding (7) and NPI-licensing (8):

(7)   a.   The British tourist drove down [every road]$_1$ on its$_1$ left-hand side.
       b.   The British tourist drove down {the/*its} left-hand side on every road.
(8)   a.   The British tourist drove down [no road] [on any sunny day].
       b.   * The British tourist drove down [any road] [on no sunny day].

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Flavors of _p_: We take to _p_ to encode a semantic relation between the event described by the main verb and time/location-modifiers (e.g. the PP-complex) of a (sub)event. We assume two 'flavors' of _p_ – PATH and LOCATION. This allows us to capture a previously unobserved generalization about PP-complexes: if one P is interpreted as a description of the path/of the location, so must the other P. That is, in (9), we observe only _two way_, and not _four way_ ambiguity.

(9)   It was down the street between the cars that the bear danced.
      = The bear danced (in circles) at the bottom of the street, between where the cars are.
      = The bear danced its way down the street, weaving between the cars.
      ≠ The bear danced its way down the street to the place between where the cars are.
      ≠ The bear danced its way between the cars which are all at the bottom of the street.

The composition proceeds as follows (10), assuming _down_ composes with [$_{PP}$ between the cars] via Event Identification (Kratzer, 1996):

(10)

$$\text{VP}$$
$$\lambda e_1.dance(e_1) \wedge \exists e_2.path/loc(e_1,e_2) \wedge between(e_2, the\ cars) \wedge down(e_2, the\ road)$$

VP: $\lambda e_v.dance(e)$

pP: $\lambda e_1.\exists e_2.path/loc(e_1,e_2) \wedge between(e_2, the\ cars) \wedge down(e_2, the\ road)$

dance

p: $\lambda P_{\langle v,t\rangle}.\lambda e_1.\exists e_2.path(e_1,e_2) \wedge P(e_2)$
or
$\lambda P_{\langle v,t\rangle}.\lambda e_1.\exists e_2.loc(e_1,e_2) \wedge P(e_2)$

PP: $\lambda e_v.between(e, the\ cars) \wedge down(e, the\ road)$

DP: the road

P: $\lambda x_e.\lambda e_v.down(e,x)$ — down

PP: $\lambda e_v.between(e, the\ cars)$ — between the cars

An extraction asymmetry: assuming that PP is a phase (Abels, 2003; Drummond, Hornstein, and Lasnik, 2010, i.a.; see also Čitko 2014), we can also explain the following asymmetry in extraction:

(11)   a.   What$_1$ did the bear amble [$_{p}$P down t_1 [$_{PP}$ toward the beehive]]?   The street.
       b.   * What$_1$ did the bear amble [$_{p}$P down the street [$_{PP}$ toward t_1]]?   Intended: the beehive.

As the structure in (6) shows, [Spec, P] is occupied by _the road_. If movement must transit via the Spec of a phase, only _the road_ can move, but not any phrase which originates lower down.

Conclusion: Examples like in (1) have received little-to-no attention in the literature since Jackendoff (1973). Although PP-complexes look like multiple modification, or ternary-branching (as originally proposed), we have shown that we can maintain the restrictiveness of binary-branching, as well as capture previously unobserved semantic generalizations by use of light-categorial heads.

References: Abels, K. Successive cyclicity, anti-locality, and adposition stranding. UConn dissertation. **Čitko, B.** 2014. Phase theory: an introduction. Cambridge University Press. **Chomsky, N.** 1995. The Minimalist Program. **Drummond, A. Hornstein, N. Lasnik, H. 2010.** A Puzzle About P-Stranding and a Possible Solution. **Jackendoff, R.S.** 1973. The Base Rules For Prepositional Phrases (in Anderson & Kiparsky, a Festschrift for Morris Halle). **Kayne, R.S.** 1981. Connectedness and Binary Branching. – 1994. The Antisymmetry of Syntax. **Kratzer, A.** 1996. Severing the External Argument from the Verb (in Rooryck & Zaring, Phrase Structure and the Lexicon). **Larson, R. K.** On the Double Object Construction. – 2014. On Shell Structure. Routledge. **Svenonius, P.** 2007. Adpositions, particles, and the arguments they introduce (in Reuland, Bhattacharya, and Spathas, Argument Structure).