

Not as Hard a Problem to Solve as You Might Have Thought

Paul Kay (UC Berkeley) and Ivan A. Sag (Stanford University)

Two understudied phenomena of English are intimately intertwined but insofar as they are studied at all are not usually related. The discontinuous modifier phenomenon (DM) illustrated in (1) and the adjectival pre-determination phenomenon (APD) illustrated in (2) are independent. That is, each of these phenomena may occur independently of the other:

- (1) a. [so] willing to help out [that they called early]
 - b. [too] far behind on points [to quit]
 - c. [more] ready for what was coming [than I was]
 - d. [as] prepared for the worst [as anyone]
 - e. (the) [same] courage in the face of adversity [as yours]
-
- (2) a. [this] delicious A LASAGNA
 - b. [that] friendly A POLICEMAN
 - c. [How] hard A PROBLEM (was it)?

The oddity, the “non-core” property, of DM examples like those in (1) is that they appear to call for a discontinuous constituent analysis. The oddity of APD examples like those in (2) is that they present an adjective modifying a determined noun phrase (or DP), rather than a nominal (a common noun or “ \bar{N} ”) – specifically an NP determined by what appears to be the singular indefinite article *a*.

Although, as we have seen in (1) and (2), DM and APD may appear independently, they frequently occur intertwined as in (3):

- (3) a. [too] heavy A TRUNK [(for me) to lift]
- b. [so] lovely A MELODY [that some people cried]
- c. [more] sincere AN APOLOGY [than her critics acknowledged]
- d. [as] good A SINGER [as many professionals]

Unsurprisingly, the initial lexical licenser determines the three-way distributional distinction displayed in (1), (2) and (3).

Licensers of DM but not APD include those comparative governors listed in (4):¹

- (4) *same...as, similar...to, equal...to/with, identical... to/with, ADJ-er...than, rather...than, prefer...to than, superior...to, inferior...to, other...than, else... than, differ...from, different...from/to/than, dissimilar...to/from*

Licensers of APD but not DM include:

- (5) *this, that, how*

And licensers of both DM and APD are listed, exhaustively we believe, in (6):

- (6) *so, too, more, less, as, such, how*

It is notable that comparative licensers are split between those that do not [(4)] and those that do [(6)] license APD. There are licensers of APD but not DM, DM but not APD, and both DM and APD.

More than one DM can occur in a clause, as exemplified in (7).

- (7) a. [so] much more satisfied than the last time [(that) he couldn't stop smiling]
b. [too] many fewer supporters than her opponent [(for her) to rely on appeals to her base]
c. [enough] bigger an audience than last time [to require standing room only]

In examples such as (7) the multiple DMs form nested dependencies. The corresponding crossed dependencies in (8) are impossible:

- (8) a. **[so] much more satisfied [(that) he couldn't stop smiling] than the last time
b. **[too] many fewer supporters [(for her) to rely on appeals to her base] than her opponent
c. **[enough] bigger an audience [to require standing room only]than last time

Other DMs may, however, participate with arguments or modifiers in either nested [(9b,d)] or crossed [(9a,c)] dependencies:

- (9) a. Kim was more [willing] than Pat [to wash the dishes].
b. Kim was more [willing] [to wash the dishes] than Pat.
c. I sent out more [books] yesterday than ever before [that I really liked].
d. I sent out more [books] yesterday [that I really liked] than ever before.

¹See Huddleston and Pullum 2002, p. 1104.

In general,

- (10) All DM licensers except *so*, *too*, and *enough* can participate in crossed dependencies with arguments and other modifiers.

Constructions in SBCG are defined as constraints on construct types; construct types are classes of constructs inter-related in a multiple inheritance hierarchy; and constructs are the feature structures that collectively constitute the model of a language. More specifically, constructions are constraints on construct types that contain non-null mother (MTR) and daughters (DTRS) values. (The DTRS feature is list-valued.)

The major constructions required to account for the above and related data are the Head-Functor Construction, the APD Construction (aka the “big mess” construction), and the Head-Extrapolation construction. In addition, lexical entries for the licensing lexical items listed in (4), (5) and (6) are required.

The Head-Functor Construction, is directly adapted from Van Eynde (J. Linguistics 42 (2006), 139186) with the extension that the marking feature is posited allow a range of values corresponding to individual markers or classes thereof. The construction is shown in (11):

(11) **Head-Functor Construction:**

$$hd\text{-func}\text{-}cxt \Rightarrow \left[\begin{array}{l} \text{MTR} \left[\text{SYN} \left[\begin{array}{l} \text{CAT} \left[\text{SEL } X \right] \\ \text{VAL } L_1 \\ \text{MKG } Y \\ \text{EXTRA } L_2 \end{array} \right] \right] \\ \text{DTRS} \left\langle \left[\text{SYN} \left[\begin{array}{l} \text{CAT} \left[\text{SEL } H \right] \\ \text{MKG } Y \\ \text{EXTRA } L_2 \end{array} \right] \right], H: \left[\text{SYN} \left[\begin{array}{l} \text{CAT} \left[\text{SEL } X \right] \\ \text{VAL } L_1 \end{array} \right] \right] \right\rangle \end{array} \right]$$

Our analysis of the APD (big mess) phenomenon differs from those of Van Eynde (2007) and Kim (2009) in locating the idiosyncrasy in the AP (modifier-adjective) constituent (e.g., *how big*), rather than the NP (AP-nominal constituent) constituent (e.g., *how big a mess*). The SBCG APD construction is given in Figure 1.

Unlike the Head-Functor Construction, the APD Construction does not describe a *headed* construct-type; there is no head daughter. Accordingly, and critically, the second daughter and the mother do not agree in their SEL value, the daughter selecting an unmarked nominal but the mother selecting a noun phrase marked with the indefinite determiner *a*. The *deg'* MRKG value shared by mother and first daughter licenses presence of just those lexical items that license the construction; they seem to constitute a subclass of (semantic) degree modifiers that resists more restrictive semantic definition. On this analysis the construction combines a *deg'* modifier with an adjective to produce an AP that selects a singular indefinite NP.

$apd-cxt \Rightarrow$

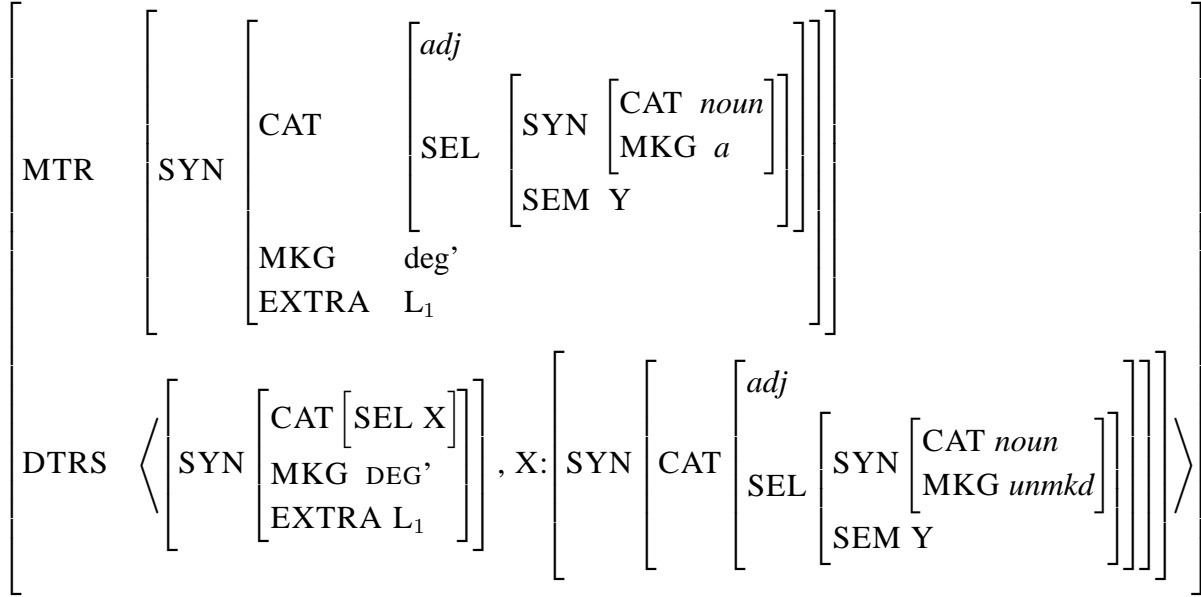
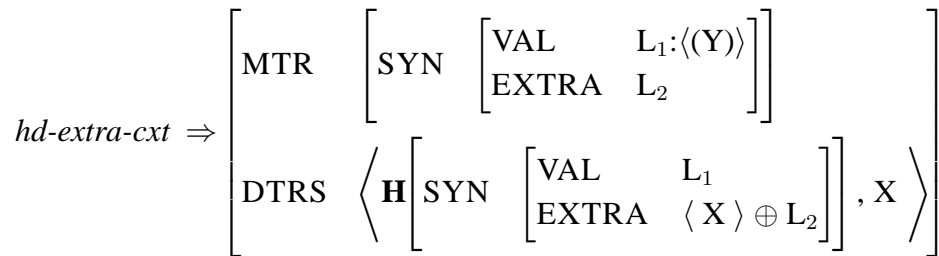


Figure 1: Adjectival-Pre-Determiner Construction

Both the Head-Function and the APD construction have a list-valued EXTRA(position) feature that identifies the mother's value with that of the first daughter (as do several other constructions). Thus, members of the EXTRA list are passed up from first daughter to mother until they are realized by the Head-Extrapolation Construction, displayed in (12):

(12) **Head-Extrapolation Construction:**



This construction realizes the initial element of the first (head) daughter's EXTRA list as the second daughter and eliminates this element from the mother's EXTRA list. (See earlier discussions by Pollard and Sag (1994), Keller (1995).)

The correct ordering possibilities of arguments and various extraposed phrases, as exemplified in (7) and (8), are assured by a construction that pumps a complement of a lexical predicator to an element of its EXTRA LIST (See (13)) along with appropriate lexical entries for the lexical licensers of extraposed phrases and the Head-Extrapolation Construction. Two example of relevant lexical entries are shown in (14) and (15). Note that *more* shuffles the extra complement it introduces into a random spot on the EXTRA list of its selectee, whereas

so appends its extra complement to the (right) end of its selectees EXTRA list. This arrangement allows the extra complement of *more* to commute with arguments or other extraposed elements, thus allowing both nested and crossed dependencies, while the complement of *so*, being the final element of the EXTRA list, must be realized at the lowest position and hence can participate in only nested dependencies. (See (8), (9), (10) above.)

(13) **Lexical Extraposition Construction:**

$$lex-extra-cxt \Rightarrow \left[\begin{array}{l} \text{MTR} \left[\text{SYN} \left[\begin{array}{l} \text{VAL} \quad L_1 \\ \text{EXTRA} \quad L_2 \oplus \langle X \rangle \end{array} \right] \right] \\ \text{DTRS} \left\langle \left[\text{SYN} \left[\begin{array}{l} \text{VAL} \quad L_1 \oplus \langle X \rangle \\ \text{EXTRA} \quad L_2 \end{array} \right] \right] \right\rangle \end{array} \right]$$

$$(14) \left[\begin{array}{l} \text{FORM} \langle \text{SO} \rangle \\ \text{SYN} \left[\begin{array}{l} \text{CAT} \left[\text{SEL} \left[\text{SYN} \left[\text{EXTRA} \quad L_1 \right] \right] \right] \\ \text{EXTRA} \quad L_1 \oplus \langle \text{S}[that] \rangle \end{array} \right] \end{array} \right]$$

$$(15) \left[\begin{array}{l} \text{FORM} \langle \text{MORE} \rangle \\ \text{SYN} \left[\begin{array}{l} \text{CAT} \left[\text{SEL} \left[\text{SYN} \left[\text{EXTRA} \quad L_1 \right] \right] \right] \\ \text{EXTRA} \quad L_1 \circ \langle \text{XP}[than] \rangle \end{array} \right] \end{array} \right]$$

The preceding discussion is abbreviated. There are further details about these distributions that are covered in the paper.

REFERENCES

Keller, Frank. 1995. Extraposition of S and PP. Proceedings of EACL.

Huddleston, Rodney, and Geoffrey K. Pullum. 2002. *The Cambridge Grammar of the English Language*. Cambridge: CUP.

Kim, Jongbok. 2009. The Big Mess construction revisited. Paper presented at BLS 35.

Pollard, Carl, and Ivan A. Sag. 1994. *Head-Driven Phrase Structure Grammar*. Chicago: U. of Chicago Press and Stanford: CSLI Publications.

Sadler, Louisa, and Douglas J. Arnold. 1994. Prenominal adjectives and the phrasal/lexical distinction. In *Journal of Linguistics* 30: 187-226.

Van Eynde, Frank. 2007. The Big Mess Construction. In Stefan Miller, ed., *The Proceedings of the 14th International Conference on Head-Driven Phrase Structure Grammar*. 415433. Stanford: CSLI Publications. URL: <http://csli-publications.stanford.edu/HPSG/8/>.