LATE

ADJUNCTION

SOLUTION TO
BRACKETING PARADOXES

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A well known problem.... and a proposal.

Words like unhappier or nuclear physicist or ungrammaticality embody a phenomenon that has received much discussion in the literature (Pesetsky (1979,1985), Sproat (1988, 1985), Stump (1991), Nissenbaum(2000), Hoeksema(1987), Light (1993), Spencer (1988) etc..), that of the Bracketing Paradox. The defining property of bracketing paradoxes is that the structure implied by the morpho-phonological properties of the construction are at odds with the structure implied by the semantic scope of a suffix/prefix pair.

What I will argue here (c.f. Nissenbaum 2000) is that these paradoxes can be solved by appealing to the independently motivated mechanism of Late Adjunction.

Late Adjunction, in conjunction with the Distributed Morphology (Halle & Marantz (1994), Marantz (1997)) maxim of Syntax All The Way Down leads us to expect late adjunction to occur within words.
Late Adjunction...

Late Adjunction, first proposed by Lebeaux (1988) and later by others, has been argued to account for the adjunct/complement asymmetry with regards to Condition C effects, VP adverbs in English (Ochi 1999), Parasitic Gaps (Nissenbaum 2000)…..

Condition C

1) a. *She$_i$ wants the picture of Seonaid$_i$.
   b. *Which picture of Seonaid$_i$ does she$_i$ want?
2) a. *She$_i$ wants the picture that Seonaid$_i$ likes.
   b. √Which picture that Seonaid$_i$ likes does she$_i$ want?

The (a) examples show typical Condition C violations. In (1b) A’ movement does not rescue the sentence, yet in (2b) it does. This is argued to be due to the fact that the argument of Seonaid, but not the adjunct that Seonaid likes, must be merged with picture before movement. The adjunct is merged after movement, and therefore Seonaid in (2b) is never c-commanded by she. In (2a) the adjunct is also merged late, but to a position c-commanded by the pronouns, causing ungrammaticality.
Morphological Late Adjunction

Let us assume that the above-mentioned argument gives us ample reason to believe in late adjunction. Given the premise of Distributed Morphology, that morphemes are concatenated in the syntax in a manner indistinguishable from that of phrases, we should expect to find word internal anti-cyclic merger of adjuncts.

What is a Morphological Adjunct?

For the purposes of this paper I will assume that those morphemes that have no Category Features to project are Adjuncts. Examples from English can be seen in (3). Examples of morphemes that cannot be adjuncts are given in (4).

(3) unhappy, reapply, misalign, nuclear physicist, up chuck…..
(4) enrage, destruction, refusal, man eater, happier…..

The bolded morphemes in (3) do not check any argument features, are not assigned case, and project no features to the root node. The bolded morphemes in (4) either project category features, or are arguments.
Some Non-Adjunct Morphemes

Some morphemes appear to be adjuncts, but are not…..

IN vs. UN

_In_ does not behave as an adjunct should. It has a phonological closeness to the root, it bleeds the –er comparative, and it is only found on adjectives. In DM terms, the difference is captured by appealing to root vs. word level morphology. Alternately, _in-_ is the realization of an a⁰ head

IN, not UN, is phonologically ‘close’ to the root.

(5)  intolerable vs. _impolite_
   untrue vs. _unpopular_

IN, not UN, bleeds the comparative suffix.

(6)  politer → *impoliter  (anonymous reviewer)
   happier → unhappier

IN, not UN, is restricted to adjetival environments.

(7)  inept vs. *inaid
    unattractive vs. _undo_
UN, not IN, is a morphological adjunct.

\[
\begin{array}{ccc}
\text{(8)} & a & \sqrt{a} \\
& \text{in} & \text{polite}
\end{array}
\quad
\begin{array}{ccc}
\text{(9)} & a & \text{or} \\
& \text{un} & \sqrt{a} \\
& \text{happy}
\end{array}
\]

Most prefixes are adjuncts, but some are not….prefixes that project category feature are not adjuncts.

EN-, BE- are not adjuncts. They project and are therefore merged cyclically.

\[
\begin{array}{ccc}
\text{(10)} & v & \sqrt{v} \\
& \text{en} & \text{a} \\
& \text{able}
\end{array}
\quad
\begin{array}{ccc}
\text{(11)} & v & \sqrt{v} \\
& \text{be} & \text{n} \\
& \text{jewel}
\end{array}
\]
Linear Edge Condition (Nissenbaum 2000)

Both Syntactic (phrasal) and Morphological Adjuncts are constrained by the LEC.

Linear Edge Condition (LEC):
For any syntactic object $SO$ accessed in an array, merge of new material is possible inside $SO$ only at the linear edge. (Nissenbaum 2000: 201)

Here the Linear Edge is assumed to be defined over the last phase sent to PF.

Syntactic Adjunction and the LEC:

“…some element (either overt or covert) at the right periphery of a vP blocks the appearance there of an extraposed relative clause.” (Nissenbaum 2000:207)
Morphological Adjunction and the LEC:

Some element, here overt, at the periphery of an X0, blocks the merger of a morphological adjunct, the particle *up.*

(c.f. Nissenbaum 2000:206)
Spell Out: Derivation vs. Inflection

Throwing up (V) vs. Thrower up/Throw upper (N)

Claim: (1) Derivational or ‘little x\(^0\)’ heads trigger Phases (Marvin 2002\(^1\)). The heads of these phases are sent to PF along with their complements. (the strong vP phase (as well as DP/CP) is not a member of this group)

(2) (strong) Inflection triggers raising. Derivation does not – derivational morphemes undergo morphological merger.

(14) a. Seonaid is eating up her broccoli.
(15) a. *Seonaid is an eater up/eat upper of broccoli.

---

\(^1\) Marvin explicitly claims that even derivational heads spell out only their complements. The facts are more complicated, as she admits, and will be discussed further below.
In (16b) the particle adjoins in accordance with the LEC. In (17b) either the adjunct or the lowered morpheme is in violation of the LEC/its selectional restrictions. The lexicon must encode the idiomatic reading of ‘eat up’, but the intervening derivational morphology impedes access to this stored form. Alternately, the adjunct is merged early, but then the nominalizer is violating the LEC by lowering to the position between the verb and the particle. This begs the question of why *eat upper is bad. I propose here that the former account of *eater up is correct, and that late adjunction of the particle is mandatory (see Stepanov 2001).
What Leads Us To The Conclusion That The Heads Of Weak Phases Are Spelled Out With Their Complements?

1. **The Phonology...**
   Marvin (2002) shows that the weak phase head needs to be phonologically present in some manner when its complement is spelled-out.

   Marvin’s Word-Relativised PIC:
   “H and its edge are spelled out at the next (strong) phase. The domain of H is spelled out at the phase of HP. A head h adjoined to H is in the domain of H.”

In the following example (Marvin 2002:53), the phase head *al* spells out its complement.

(18) line 1     *       *
   line 0       (*   *     (*   ] *

   governmental  $\rightarrow$ gouvernmént $\rightarrow$ gouvernméntal

(next phase)
In (18) the RLR Edge Marking and Main Stress Rules of Halle (1998) are used to explain the phonological behaviour of governmental. These phonological rules must have access to the phonological shape of the phase head, indicating that it has been sent to the MS/PF components. If this were not the case, we would expect the following unattested form, as line 1 and 2 markings are subject to the PIC.

(19)  
\begin{align*}
\text{line 1} & \quad * \\
\text{line 0} & \quad (* \quad * \quad * \\
\text{government} & \rightarrow \text{gouvernement} \rightarrow \text{gouvernemental}
\end{align*}

2. The Morphology…

Strong Phase Heads (e.g. v(oice)\textsuperscript{0}) have the following properties.

i) They may move out of their phase.

(20) Ils ont\textsubscript{i} souvent [\textsubscript{VP} t\textsubscript{i} manger].

(this does not necessarily force the conclusion that these heads are not spelled out with their phase (c.f. Fox and Pesetsky (2004))
They may show allomorphy sensitive to more peripheral morphemes which are outside of their phase.

(21) a. He [PRES] \([v_P \text{ goes to the store}].\)
    b. He [PAST] \([v_P \text{ went to the store}].\)

(If the verb were spelled out in the vP phase, it would not be able to show allomorphy conditioned by the features of the T\(^0\) head, without the assumption that lexical items are merged with phonological/tense features in the syntax)

**Weak Phase Heads** (e.g. n\(^0\), a\(^0\), v\(^0\)) do not have the above properties.

(22) \(\text{[Tion}_i\text{ was given a [motivate t}_i\text{] intended: A motivation was given.}\)

(23) \([^[[\text{motiv}_v\text{[at}_v\text{]or}_n\text{]}\] but \*[^[[\text{motiv}_v\text{[ize}_v\text{]ing}_v\text{]}\]

where v\(^0\) shows sensitivity to the syntactic category features of the outer morpheme (that I am aware of). This lack of derivational outwards-sensitivity is unexpected if the derivational heads are not spelled-out with their complements, although this could be an accidental gap. (On outward sensitivity see Bobaljik (2000) and references therein.)
All Bracketing Paradoxes Contain A Morphological Late Adjunct.

(24) UNHAPPIER contains UN
(25) NUCLEAR PHYSICIST contains NUCLEAR
(26) UNGRAMMATICALITY contains UN (although not a telling example, c.f. Halle & Vergnaud 1987)

The morpho-phonological requirements force us to assume the following structures:

```
un
  \--
   happy er

nuclear
  \--
   physic  ist

un
  \--
   grammatical  ity
```

The semantic requirements force us to assume the following structures:

```
er
  \--
   ist

un happy
  \--
   nuclear  physic

un grammatical
  \--
   ity
```
A happier *unhappier* derivation...

**Numeration 1** → (NS)

<happy, a>

→ (MS/PF)

→ HAPPY

**Numeration 2** → (NS)

<X(a phase head), Deg>

This is assuming that the Degree head is not a phase head.
Deg Undergoes Morphological Merger, as its complement is of the right phonological shape (Embick & Noyer 2001). The -er allomorph is inserted and spelled-out.

HAPPIER

Numeration 3

<un…>

Where … indicates further lexical items, if any.

UNHAPPIER

N.B. If un- were to be numerated in the previous phase, the environment for –er would be bled, and we get the also grammatical ‘more unhappy’.
A note on *Ungrammaticality* and a Nuclear Physicist in a nutshell…

How ungrammaticality is grammatical…

In Halle and Vergnaud (1987), and again in Light (1993), it is noted that *ungrammaticality* can have a derivation where both the semantic and phonological requirements are satisfied by the same structure:

\[
[[[un]\text{grammatical}]\text{ity}]
\]

Here, assuming that *un*- is not cyclic, and –*ity* is, we only have to assume that it is linear and not structural proximity that allows –*ity* to affect the stress of the root. As this is the case, this example does not give positive evidence of late adjunction. Assuming, following Stepanov, that adjuncts must be the last elements merged in a numeration, I propose the following derivation.
Though this is a possible derivation, nothing is stopping the adjunct –un from merging in the next phase. This could be proposed in order to unify this derivation with that of *unhappier*, which a Halle and Vergnaud treatment cannot capture.

**But a Nuclear Physicist cannot fit in a nutshell!**

Assuming that allomorphy is conditioned locally, the affix –ist must merge with the root before compounding occurs. i.e. physics[k]s vs. physics[s]ist is not a phonological rule, c.f. *cyst* [sIst] (Selkirk 1982).

\[\text{nuclear}[\text{physicist}]\]

But, we then predict the semantics of the above to be ‘a nuclear (very small) physicist’ and not ‘a practitioner of nuclear physics’.
This paradox is solved by the present analysis in the following way;

**Numeration 1** ➔ (NS) ➔ <physic, ist>

```
          n
         / \
physic  ist
```

➔ (MS/PF) ➔ the root physi[s] is conditioned by –ist. ➔ PHYSICIST

**Numeration 2** ➔

```
<X(a phase head), nuclear>
            X
           /  \
          X    n
         /    \
        √     ist
```

➔ (MS/PF) ➔ NUCLEAR PHYSICIST
Some Previous Analyses....

PESETSKY (1985).... Quantifier Raising.

A problem: As QR leads to scope ambiguities, we expect them here, but they are not found (Hoeksema 1987).

STUMP (1991).... Paradigm Functions.

A root that has been affixed by a non-category changing affix is still visible to paradigm functions. Therefore those roots will be inflected on their heads. E.G. unhappy has the same category features as happy, and therefore the paradigm slot happier is selected in the scope of the degree-comparative head.

A problem: The extra machinery of paradigms (contra paradigms see Bobaljik 2004) is not necessary, as argued here.

See also Kiparsky (1982), Falk (1991), Spencer (1988), Sproat (1992), Light (1991)...
Conclusions.

1. LATE ADJUNCTION (Lebeaux (1988) and others) OCCURS TO $X^0$ AS WELL AS $XP$.

2. ALL BRACKETING PARADOXES INVOLVE A MORPHOLOGICAL ADJUNCT.

3. ADJUNCTS (Stepanov 2001) HAVE NO UNINTERPRETABLE FEATURES AT THEIR ROOT NODE. THEY DO NOT PROJECT. THIS ENTAILS THAT THEY ARE MERGED POST-CYCLICALLY.

4. MORPHEMES THAT PROJECT CATEGORY FEATURES ARE PHASE HEADS (Marantz 2001, Marvin 2002).

5. ADJUNCTS MUST BE MERGED IN THE POSITION WHERE THEY WILL BE INTERPRETED AT LF.

6. LITTLE $x$ PHASE HEADS SPELL OUT WITH THEIR COMPLEMENTS.

7. THE LINEAR EDGE CONDITION (Nissenbaum 2000) HOLDS. LATE ADJUNCTS ARE CONSTRAINED TO A PHONOLOGICAL EDGE.
First, the longstanding debate over the structure of particle verbs stems from a structural paradox: the particle in a particle verb behaves both like a phrase (in that it is separable from the verb) and like a head (in word formation) (Den Dikken 1992, 1995, Svenonius 2002, Zeller 1999, Wurmbrand 2000 to mention a few).

(27) John flechtet den Buchstaben ein
    John braid the letter in
    ‘John inserted the letter’

(28) die Einflechtung des Buchstaben
    ‘the insertion of the letter’

Secondly, there are bracketing paradoxes involving particle verbs on par with the English cases above, where the particle forms a semantic unit with the verb, but is not phonologically adjacent to it (Müller 2003).
(29) herum-ge-renn-e ‘acts of aimless running’ NOT ‘aimless acts of running’

Here, just as in the case of *unhappier*, it appears that two separate structures are needed in order to account for the phonological and semantic structures implied by the construction.

(30) **Phonological Structure**

```
        N
       /   \
      P    N
     herum  \\
        V   \\
        ge- -e
        \\
        V   \\
        renn
```

**Semantic Structure**

```
        N
       /   \
      V    ge- -e
     herum  P
          V
          renn
```

(Müller 2003:249)

As implied above with the inclusion of the English *throw up* and *up chuck* examples, the solution to the typical Particle Verb paradox in (4) is amenable to the proposal herein. Here I will show how this follows from the assumptions above. I will also briefly show how the atypical paradox in (1) and (2) is also captured within the theory presented here.
Explaining the paradox... Particles Are Late Adjuncts

Assumptions to keep in mind:
1. (Strong) Inflection triggers raising.
2. Derivational Heads Lower at MS/PF, and are spelled out with their complements.
3. Adjuncts are merged where they are interpreted.

Ancillary Assumptions:
1. The circumfix \textit{ge-} -\textit{e} in (4) consists of the inflectional participial prefix \textit{ge-} and the nominalizer \textit{–e}. These are separate heads.
2. Head Movement reconstructs at LF.

A Run Around the Herumgerenne Paradox....
Numeration 1 $\rightarrow$ (NS) $\rightarrow$ the null v and the root are spelled out. $\rightarrow$ RENN

Numeration 2 $\rightarrow$ (NS) $\rightarrow$ the derivational e lowers to Part$^0$ and spells out with its complement $\rightarrow$ GERENNE
The above derivation captures the Phonological Form of the nominalized Particle Verb, and its Semantic Scope.
A Non-Violation of Lexical Integrity

The non-nominal derivations where the verb is separated from its particle (27, repeated below as 31a) can also be accounted for by assuming raising of the verb and late, low merger of the adjunct.

(31)  a. [CPJohn [flecht] [TPden Buchstaben [VP [ein ti]]]]
   John braid the letter in
   ‘John inserted the letter’

   b. [TP John [VP is [PartPthrowing [VP it [V ti up]]]]]

Here the verb raises before the particle is merged. It later reconstructs to be interpreted. No special structure is needed to explain the apparent violation of Lexical Integrity. Particle Verbs are Complex Heads.
SELECTED REFERENCES

Fox, D. and D. Pesetsky (2004) Cyclic Linearization of Syntactic Structure. draft. MIT.
Wurmbrand 2000 The Structure(s) of Particle Verbs. Draft.