Pseudo-Melting and the Analysis of Movement-Related Morphology

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1. Background

Three possible analyses of (apparent) correlations of syntactic and morphological phenomena:

- The morphological phenomenon makes the syntactic phenomenon possible.
- The syntactic phenomenon makes the morphological phenomenon possible.
- Closer inspection reveals that there is no interaction after all.

(1) *V-to-T movement and rich verb inflection*:
  a. Rich verb inflection makes V-to-T movement possible.
     ← Roberts (1993), Vikner (1997, 2001b), Holmberg & Platzack (1995), Rohrbacher (1999)
  b. V-to-T movement makes rich verb inflection possible.
     ← Bobaljik (2002)
  c. There is no (synchronically relevant) correlation between V-to-T movement and rich verb inflection. ← Alexiadou & Fanselow (2000), Vikner (2001a)

(2) *Pro-drop and rich verb inflection*:
  a. Rich verb inflection makes pro-drop possible.
     ← Rizzi (1986), Jaeggli & Safir (1989), Müller (2006), Neeleman & Szendröi (2006)
  b. Pro-drop makes rich verb inflection possible. ← no-one?
  c. There is no (synchronically relevant) correlation between pro-drop and rich verb inflection.
     ← Grimshaw & Samek-Lodovici (1998)
  d. Pro-drop is not a syntactic phenomenon. ← Adger (2003), Holmberg (2004)

(3) *Scrambling and rich nominal case inflection*:
  a. Rich nominal case inflection makes scrambling possible.
     ← Haider (1988), Fanselow (1992)
  b. Scrambling makes rich nominal case inflection possible. ← Müller (2002))
  c. There is no (synchronically relevant) correlation between scrambling and rich nominal case inflection. ← Müller (1995)

(4) *Successive-cyclic movement and movement-related morphology*:
  a. Movement-related morphology makes successive-cyclic movement possible
     ← no-one so far?
  b. Successive-cyclic movement makes movement-related morphology possible: morphological pieces act as *reflexes of successive-cylic movement*
     ← the standard view: McCloskey (1979, 2002), Clements et al. (1983), Collins (1993, 1994), Chung (1994, 1998), Cole & Hermon (2000), Fanselow & Ćavar (2001), Sabel (2000), Lahne (2008), many others

  c. There is no (synchronically relevant) correlation between successive-cyclic movement and movement-related morphology
     ← no-one (but see Lahne (2008) on independent occurrences of virtually all pieces of movement-related morphology).

(5) *Claims*:
  (i) The approach to CED effects developed in Müller (2008) suggests a concept of *pseudo-melting* as a way to avoid island effects.
  (ii) This concept can be extended to the domain of movement-related morphology: Movement-related morphology can be viewed as effecting pseudo-melting, in the sense that a category which would otherwise act as an island becomes transparent for movement. On this view, movement-related morphology is not a reflex; rather, it makes (certin kinds of) successive-cyclic movement possible.
  (iii) So far, there is little independent empirical support for such a view of movement-related morphology; but on the conceptual side, the new approach might offer an account as to why this phenomenon exists in the first place (unlike standard accounts).

2. Outline of the Analysis in Müller (2008)

2.1 Context

Question:
How can the effects of the Condition on Extraction Domain (CED; Huang (1982), Chomsky (1986, 1995, 2005), Cinque (1990), Manzini (1992)) be made to follow in the minimalist program?

Background:
Chomsky (2000, 2001, 2005): PIC forces successive-cyclic movement via phase edges; such movement is possible because edge features that drive it can be inserted.

(6) *Phase Impenetrability Condition* (PIC):
The domain of a head X of a phase XP is not accessible to operations outside XP; only X and its edge are accessible to such operations (where edge of X = specifier(s) of X).

Claim:
CED effects can be derived from the PIC if the following four assumptions are made:

1. All syntactic operations are driven by features of lexical items.
2. These features are ordered on lexical items.
3. All phrases are phases.
4. Edge features that trigger intermediate movement steps can be added only as long as the phase head is still active.

(7) *Condition on Extraction Domain* (to be derived from the PIC):
  a. Movement must not cross a barrier.
  b. α is a barrier if the operation that has merged α in a phase Γ is the final operation in Γ.

2.2 Assumptions

(i) All syntactic operations are feature-driven

(8) *Two types of features that drive operations*:
- a. Structure-building features (edge features, subcategorization features) trigger (external or internal) Merge: [•F•]
- b. Probe features trigger Agree: [∗F∗].

(ii) Features on lexical items are ordered

(9) a. *Θ-roles*:
$\Theta_1 \gg \Theta_2 \gg \Theta_3$ (AGENT ≫ THEME ≫ GOAL)
- b. *Subcategorization features*:
$[\bullet P \bullet]_3 \succ [\bullet D \bullet]_2 \succ [\bullet D \bullet]_1$

(10) *Last Resort* (LR, revised):
- a. Every syntactic operation must discharge (and delete) either [•F•] or [*F*].
- b. Only features on the top of a feature list are accessible.

Extension:
The same goes for probe features: They show up on a separate stack, and if there is more than one, they are ordered on a lexical head (the latter assumption will not be important in this lecture, though).

(iii) All phrases are phases

(11) *Phase*:
All phrases are phases.

Consequence:
Wh-movement must proceed via every XP edge domain on its way to its ultimate target position (the $C_{[\bullet wh \bullet]}$ node that attracts it), given the PIC.

(iv) Edge feature insertion

(12) *Edge Feature Condition* (EFC):
An edge feature [•X•] can be assigned to the head γ of a phase only if (a) and (b) hold:
- a. γ has not yet discharged all its structure-building or probe features.
- b. [•X•] ends up on top of γ's list of structure-building features.

2.3 Deriving the Condition on Extraction Domain

2.3.1 Analysis: Merge

Deriving the CED:

1. If an edge feature [•X•] is to be inserted on a phase head γ, it must go to the top of γ's list of structure-building features. (EFC)
2. γ must contain at least one other feature at this point (otherwise it is inert). (EFC)
3. But then, [•X•] is discharged again immediately (last-in/first-out). (LR)
4. Thus, it is impossible to insert an edge feature for a category α that is merged in Γ as the last operation taking place in Γ. (EFC)
5. Therefore, a moved item in the edge domain of an α merged last in Γ is not accessible anymore outside Γ (assuming a non-recursive notion of edge). (PIC)
6. Consequently, extraction from α is predicted to be impossible. (PIC)
7. Given that (outer) specifiers are last-merged in their projections, they are thus barriers for movement. (CED derived)

(13) *Why specifiers are barriers*:
α_i is a specifier that is last-merged in its phase.
- a. Edge feature insertion follows specifier feature discharge:
$\rightarrow$ γ: [•α•]
$\rightarrow$ γ: Ø
$\rightarrow$ γ: [•X•]
$\rightsquigarrow$ violates (12-a)
- b. Edge feature insertion precedes specifier feature discharge, version 1:
$\rightarrow$ γ: [•α•]
$\rightarrow$ γ: [•α•] $\succ$ [•X•]
$\rightarrow$ γ: [•X•]
$\rightsquigarrow$ violates (12-b)
- c. Edge feature insertion precedes specifier feature discharge, version 2:
$\rightarrow$ γ: [•α•]
$\rightarrow$ γ: [•X•] $\succ$ [•α•]
$\rightarrow$ γ: [•α•]
$\rightsquigarrow$ does not help because of (10-b)

Conclusion:
Specifiers are barriers because of the PIC: There is no way to carry out an intermediate movement step from a last-merged specifier to the specifier of the minimal phase above it.

(14) *Why complements do not have to be barriers*:
$\rightarrow$ γ: [•β•] $\succ$ [•α•]
$\rightarrow$ γ: [•α•]
$\rightarrow$ γ: [•X•] $\succ$ [•α•]
$\rightarrow$ γ: [•α•]
$\rightarrow$ γ: Ø
$\rightsquigarrow$ violates nothing

(14) Edge feature insertion precedes complement feature discharge, version 1:
$\rightarrow$ γ: [•β•] $\succ$ [•α•]
$\rightarrow$ γ: [•β•] $\succ$ [•X•] $\succ$ [•α•]
$\rightarrow$ γ: [•X•] $\succ$ [•α•]
$\rightsquigarrow$ violates (12-b)

(14) Edge feature insertion precedes complement feature discharge, version 2:
$\rightarrow$ γ: [•β•] $\succ$ [•α•]
$\rightarrow$ γ: [•X•] $\succ$ [•β•] $\succ$ [•α•]
$\rightarrow$ γ: [•β•] $\succ$ [•α•]
$\rightsquigarrow$ does not help because of (10-b)

Conclusion:
Movement out of complements can respect the PIC: There is a stage in the derivation where the complement feature has already been discharged (so that subsequent edge feature insertion can attract an item within the complement), but the specifier feature has not yet been discharged.

Note:
Under this approach, intermediate movement steps to phase edges must take place *before* a (final) specifier is merged.

(15) **DP**$_2$ ... [$_{vP}$ DP$_1$ [$_{v'}$ $\underline{\mathbf{t}''_2}$ [$_{v'}$ V+v [$_{VP}$ DP$_3$ [$_{V'}$ $\underline{\mathbf{t}'_2}$ [$_{V'}$ t$_V$ $\mathbf{t}_2$]]]]]]

Consequences:

- Subjects are barriers (both Specv and SpecT).
- Adjuncts are barriers (assuming that they are last-merged specifiers of special functional projections).
- Indirect objects bearing dative are barriers (assuming that they are last-merged in SpecV).

2.3.2 Analysis: Agree

Problems:
(i) So far, the prediction is that THEME (accusative) objects can avoid becoming a barrier in VP only if there is something else that is merged later. This prediction is not borne out; see (16-ab) (examples from German).
(ii) Movement out of THEME (accusative) objects is known to depend on a tight relation between V and N ("natural predicate"); see (16-bc) (Cattell (1976)). This fact is not accounted for either under present assumptions.

(16) *Accusative DPs as partly transparent local domains*:

a. [$_{PP_1}$ Worüber] hat er der Maria [$_{DP}$ ein Buch t$_1$] gegeben ?
about what has he$_{nom}$ the Maria$_{dat}$ a book$_{acc}$ given

b. [$_{PP_1}$ Worüber] hat der Fritz [$_{DP}$ ein Buch t$_1$] gelesen ?
about what has the Fritz$_{nom}$ a book$_{acc}$ read

c. *[$_{PP_1}$ Worüber] hat der Fritz [$_{DP}$ ein Buch t$_1$] geklaut ?
about what has the Fritz$_{nom}$ a book$_{acc}$ stolen

Analysis in Müller (1995), Sauerland (1995), Davies & Dubinsky (2003), Schmellentin (2006); based on Baker (1988):

- Abstract incorporation of N into V must apply to remove barrier status from an NP. (Assumption: Head movement opens barriers, and abstract incorporation is head movement at LF.)
- Abstract incorporation can be viewed as co-indexing under minimality (see Head Movement Constraint) in syntax.
- V-N:*read-book* is a natural predicate resulting from abstract incorporation; V-N:*steal-book* is not (for most speakers).

Reanalysis:

- Abstract incorporation is an instance of Agree: If V and N form a natural predicate, they share an abstract feature [$*$f$*$]/[f].
- Agree requires c-command, but is less local: An intervening D is unproblematic.

(17) *Abstract incorporation as [*f*]/[f] Agree*:

a. [$_{VP}$ V$_{[*f*]}$ [$_{DP}$ D [$_{NP}$ N$_{[f]}$ PP]]] *read book*
b. [$_{VP}$ V [$_{DP}$ D [$_{NP}$ N PP]]] *steal book*

Note:
A similar account can be given for the bridge verb phenomenon: Bridge verbs undergo Agree (with respect to [$*$f$*$]/[f]) with C of its complement; non-bridge verbs do not.

(18) *Bridge vs. non-bridge verbs*:

a. Wen$_1$ denkst du [$_{CP}$ dass sie t$_1$ getroffen hat] ?
whom think you that she met has

b. *Wen$_1$ weisst du [$_{CP}$ dass sie t$_1$ getroffen hat] ?
whom know you that she met has

Note:
This implies that either the PIC is relaxed for Agree, or that Agree can be successive-cyclic. Something to this effect is required independently, under many versions of the PIC (cf., e.g., agreement of T with nominative objects in Icelandic; and the analysis of long-distance agreement in general).

Observation:
Probe features on a phase head can never remove barrier status from a last-merged specifier:

1. A probe feature cannot carry out Agree with (some item in) its specifier (Chomsky (2001, 2005)).

2. A probe feature cannot carry out Agree with (some item in) its complement after a specifier has been merged. (For instance, Agree(v,α in VP) (for accusative case assignment) must precede Merge(DP$_{ext}$,v').) This follows from a restrictive version of the *Strict Cycle Condition* (Chomsky (1973)).

(19) *Strict Cycle Condition* (SCC):
Within the current domain α, a syntactic operation may not exclusively apply to positions that are included within another domain β that is dominated by α.

Consequences:
(i) Last-merged specifiers continue to be barriers.
(ii) Non-last-merged specifiers and complements are not barriers.
(iii) Last-merged complements are not barriers if the phase head has an additional probe feature for Agree with/into the complement.

(20) *Why last-merged complements do not have to be barriers*:
γ (e.g., V) is merged with α (e.g., DP) and has thereby discharged all its structure-building features.

a. Edge feature insertion follows complement feature discharge, no probe feature:

$$\rightarrow \boxed{\begin{array}{l}\gamma\text{: } [\bullet\alpha\bullet] \\ \gamma\text{: } \emptyset \\ \gamma\text{: } [\bullet X\bullet]\end{array}} \quad \rightsquigarrow \text{violates (12-a)}$$

b. Edge feature insertion follows complement feature discharge, with probe feature:

$$\rightarrow \boxed{\begin{array}{ll} & \gamma\text{: } [\bullet\alpha\bullet] \\ & \quad [*f*] \\ \rightarrow & \gamma\text{: } [*f*] \\ \rightarrow & \gamma\text{: } [\bullet X\bullet] \\ & \quad [*f*]\end{array}} \quad \rightsquigarrow \text{violates nothing}$$

Note:
To avoid a SCC violation (as it would occur with specifiers), the probe feature must be discharged before the structure-building edge feature in (20-b) (this is unproblematic given that the two features are on different stacks).

Clausal heads:
(i) A clausal head (V, v, T, C, ...) *status-governs* (Bech (1955/1957)) the head of its verbal complement.
(ii) This can be viewed as co-indexing of heads (abstract incorporation, hence Agree in the present approach); Sternefeld (1991), Müller (1995).
(iii) Consequently, clausal projections are not barriers, even if there is no specifier present (and the projection is thus last-merged). (*... but see below*)

3. Melting

An interesting effect is predicted under present assumptions: A specifier α of Γ ceases to be an barrier when some β becomes an outer specifier of Γ by movement.

3.1 Melting effects with scrambling in German

(21) *Melting effects with was-für split; subjects*:

a. *Was$_1$ haben [$_{DP_3}$ t$_1$ für Leute] [$_{DP_2}$ den Fritz] getroffen ?
what have for people$_{nom}$ the Fritz$_{acc}$ met

b. Was$_1$ haben [$_{DP_2}$ den Fritz] [$_{DP_3}$ t$_1$ für Leute] t$_2$ getroffen ?
what have the Fritz$_{acc}$ for people$_{nom}$ met

(22) *Melting effects with PP extraction from DP; subjects*:

a. *[$_{PP_1}$ Über wen] hat [$_{DP_3}$ ein Buch t$_1$] [$_{DP_2}$ den Fritz] beeindruckt ?
about whom has a book$_{nom}$ the Fritz$_{acc}$ impressed

b. [$_{PP_1}$ Über wen] hat [$_{DP_2}$ den Fritz] [$_{DP_3}$ ein Buch t$_1$] t$_2$ beeindruckt ?
about whom has the Fritz$_{acc}$ a book$_{nom}$ impressed

Analysis:
(i) Scrambling is triggered by a designated structure-building feature on v: [$\bullet\Sigma\bullet$]
(ii) If v still has a [$\bullet\Sigma\bullet$] feature left after discharge of [$\bullet$D$\bullet$] (= Merge of the external argument DP), an edge feature [$\bullet$X$\bullet$] can be inserted before the phase is complete.
(iii) Therefore, the phase head can now attract an item out of the external argument to its edge position.

(23) $\underline{\text{PP}_1}$ ... [$_{vP}$ DP$_2$ [$_{v'}$ $\underline{\text{t}''_1}$ [$_{v'}$ [$_{DP_3}$ $\underline{\text{t}'_1}$ ... $\underline{\text{t}_1}$] [$_{v'}$ [$_{VP}$ ... t$_2$ ...V] v]]]]

(24) *How the melting effect is derived*:

$$\rightarrow \boxed{\begin{array}{l}\gamma\text{: } [\bullet\beta\bullet] \succ [\bullet\alpha\bullet] \succ [\bullet\delta\bullet] \\ \gamma\text{: } [\bullet\alpha\bullet] \succ [\bullet\delta\bullet] \\ \gamma\text{: } [\bullet\delta\bullet] \\ \gamma\text{: } [\bullet X\bullet] \succ [\bullet\delta\bullet] \\ \gamma\text{: } [\bullet\delta\bullet] \\ \gamma\text{: } \emptyset\end{array}} \quad \rightsquigarrow \text{violates nothing}$$

Prediction:
The same effect arises in double object constructions; V adjacency as such is irrelevant.

(25) *Melting effects without V adjacency; subjects*:

a. *Was$_1$ haben [$_{DP_3}$ t$_1$ für Leute] [$_{DP_2}$ dem Fritz] [$_{DP_3}$ Bücher] geschenkt ?
what have for people$_{acc}$ the Fritz$_{dat}$ books$_{acc}$ given

b. Was$_1$ haben [$_{DP_2}$ dem Fritz] [$_{DP_3}$ t$_1$ für Leute] t$_2$ [$_{DP_3}$ Bücher] geschenkt ?
what have the Frith$_{dat}$ for people books given

(26) *Melting effects with indirect objects*:

a. *Was$_1$ hat er [$_{DP_3}$ t$_1$ für Leuten] [$_{DP_2}$ den Fritz] vorgestellt ?
what has he$_{nom}$ for people$_{dat}$ the Fritz$_{acc}$ introduced

b. Was$_1$ hat er [$_{DP_2}$ den Fritz] [$_{DP_3}$ t$_1$ für Leuten] t$_2$ vorgestellt ?
what has he$_{nom}$ the Fritz$_{acc}$ for people$_{dat}$ introduced

3.2 Melting effects with scrambling in Czech

The same phenomenon shows up in Czech; it can be seen very clearly in DP split constructions (Fanselow & Lenertová (2007), Kučerová (2006)), but also with other instances of movement from DP. The analysis is essentially identical to that given for German (assuming that Czech scrambling of the type shown here targets Specv); the different position of the verb is irrelevant. (Data and judgements in this section are due to Petr Biskup and Denisa Lenertová; they have been confirmed by Pavel Caha, Ivona Kučerová, and other Czech linguistis.)

(27) *Melting effects with DP split constructions*:

a. *[$_{NP_1}$ Holka] neudeřila [$_{DP_3}$ žádná t$_1$] Petra$_2$
girl$_{nom}$ hit no$_{nom}$ Petr$_{acc}$
'No girl hit Petr.'

b. [$_{NP_1}$ Holka] neudeřila Petra$_2$ [$_{DP_3}$ žádná t$_1$] t$_2$
girl$_{nom}$ hit Petr$_{acc}$ no$_{nom}$

'No girl hit Petr.'

c. [$_{NP_1}$ Holku] neudeřil Petr$_2$ [$_{DP_3}$ žádnou t$_1$]
girl$_{acc}$ hit Petr$_{nom}$ no$_{acc}$
'Petr hit no girl.'

(28) *Melting effects with PP extraction from DP*:

a. *[$_{PP_1}$ O starých autech] oslovila [$_{DP_3}$ kniha t$_1$] Petra$_2$
about old cars fascinated book$_{nom}$ Petr$_{acc}$
'A book about old cars fascinated Petr.'

b. (?)[$_{PP_1}$ O starých autech] oslovila Petra$_2$ [$_{DP_3}$ kniha t$_1$] t$_2$
about old cars fascinated Petr$_{acc}$ book$_{nom}$
'A book about old cars fascinated Petr.'

c. [$_{PP_1}$ O starých autech] četl Petr$_2$ [$_{DP_3}$ knihu t$_1$]
about old cars read Petr$_{nom}$ book$_{acc}$
'Petr read a book about old cars.'

(29) *Melting effects with wh-movement from DP (in violation of the Left Branch Condition)*:

a. *Čí$_1$ udeřila [$_{DP_3}$ t$_1$ sestra] Petra$_2$ t$_2$?
whose hit sister$_{nom}$ Petr$_{acc}$
'Whose sister hit Petr?'

b. (*)Čí$_1$ udeřila Petra$_2$ [$_{DP_3}$ t$_1$ sestra] t$_2$?
whose hit Petr$_{acc}$ sister$_{nom}$
'Whose sister hit Petr?

c. Čí$_1$ udeřil Petr [$_{DP_3}$ t$_1$ sestru] ?
whose hit Petr$_{nom}$ sister$_{acc}$
'Whose sister did Petr hit?'

4. Pseudo-Melting

4.1 Transparent Subjects

Observation:
It has sometimes been claimed, for certain movement types or certain languages, that subjects are not necessarily barriers for extraction.

- Haider (1983, 1993) on German
- Frantz (1980) on Blackfoot
- Bickel (2004) on Belhare
- Lasnik & Saito (1992), Takahashi (1994), Rackowski & Richards (2005) on Japanese (for null operator movement).
- Stepanov (2007) on Navajo, Turkish, Palaun, Hungarian, Russian

Assumption:
(i) Many of the putatitve counter-examples to the generalization that subjects in Specv are islands can be rejected by showing that they either involve VP-internal arguments or no extraction at all, or melting.

(ii) However, it may be that such a way out is not available for all constructions, and all languages where apparent exceptions from the CED have been observed.

What can be done?

- One can adopt a freezing approach: Specv is transparent, SpecT is a barrier. (See Kitahara (1994), Takahashi (1994), Boeckx (2003), Gallego & Uriagereka (2006), Stepanov (2007); and Rizzi (2006, 2007) for a somewhat narrower concept of freezing that does not derive CED effects).
  Problem: This is not compatible with the data given above.
- One can weaken the basic assumptions, and invoke parametrization.
  Example: Rackowski & Richards (2005, 585) assume that CED effects with subjects can be avoided if a language can establish an Agree relation between v and a specifier.
  (Also cf. Gallego & Uriagereka (2006).)
  Problem: This violates the c-command requirement on Agree relations assumed in Chomsky (2001, 2005) and much related work.
- One can pursue a *pseudo-melting* approach and look for a (possibly covert) item that is merged externally after an external argument DP (CP) in these cases.

Terminology:

- *Melting*: Internal Merge of some (typically overt) non-expletive XP above a specifier α within the same phase makes α transparent for extraction.
- *Pseudo-Melting*: External Merge of some (possibly covert) expletive XP above a specifier α within the same phase makes α transparent for extraction.

4.2 Expletive Constructions in English

Observation (Moro (1997), Lasnik & Park (2003)):
The associate DP in English expletive constructions is not inherently a barrier; see (30-ab). (In contrast, DP is a barrier for extraction in locative inversion constructions, as in (30-c)).

(30) *English expletive constructions*:

a. Which wall$_1$ do you think there$_3$ was [$_{vP}$ t$_3$ [$_{v'}$ v [$_{DP_2}$ a picture of t$_1$]]] ?
b. Which candidate$_1$ were there$_3$ [$_{DP_2}$ posters of t$_1$] all over town ?
c. *Who$_1$ do you think [$_{PP_3}$ on this wall] hung [$_{DP_2}$ a picture of t$_1$] t$_3$?

Assumption (Williams (1994, 2006), Hazout (2004), Hartmann (2005)):
The expletive is a subject, and the DP its predicate, with both items merged in the same projection (vP).

Consequence:
DP$_2$ in (30-ab) is in fact not last-merged in its projection because *there* is merged later, in the same projection (subsequently, *there* undergoes raising to SpecT). Therefore, DP$_2$ does not have to be an island for extraction.

4.3 Subject Clauses in German

Caveat:
What follows is not a full analysis; it is just supposed to show a direction in which one might profitably look upon encountering exceptions to the CED with external arguments in Specv that are transparent for extraction (or related configurations), in a given language: In those cases, it might well be that there is a (possibly non-overt) item that is merged later, in the same projection, which thereby permits the insertion of an edge feature for some item in the specifier of an otherwise opaque XP, thereby creating a pseudo-melting effect.

Speculation:
Another case that might shed some light on this issue is that of a German expletive pronoun *es* optionally accompanying a finite subject clause from which extraction has taken place. Fanselow & Mahajan (2000) claim that (31-a) (extraction in the presence of *es*) is just as good as (31-b) (extraction from a subject clause without *es* being present); interestingly, for some speakers, the presence of *es* actually *improves* the example. (That said, for what is perhaps the majority of speakers, both examples are equally ungrammatical, as one would expect under the approach developed above; also see Stechow (2000).)

(31) *Extraction from finite subject clauses with and without an expletive*:

a. #Wen$_1$ ärgert es dich [$_{CP}$ dass sie t$_1$ liebt] ?
whom$_{acc}$ annoys it you$_{acc}$ that she$_{nom}$ loves

b. #Wen$_1$ ärgert dich [$_{CP}$ dass sie t$_1$ liebt] ?
whom$_{acc}$ annoys you$_{acc}$ that she$_{nom}$ loves

Data judgements:
(i) Fanselow & Mahajan (2000): (31-ab) are both well formed.
(ii) Stechow (2000): (31-ab) are both ill formed.
(iii) Some speakers: The presence of *es* **improves** the example.

Assumptions needed to derive (iii) (pseudo-melting):
(i) The (phrase headed by the) expletive does not stand in a dominance relation with the subject clause (as in Ross (1967) and much later work).
(ii) The expletive is merged after the finite subject clause, but within the same projection.

Consequence:
Some item in the left edge of the subject clause will be able to undergo edge-feature driven movement to an outer vP specifier (while the subject clause is still in situ), and a CED effect can be avoided.
(Speculation on (31-b) if it is accepted as grammatical: zero expletives.)

Conclusion for what follows:
(31-ab) are in fact ungrammatical. Consequently, either assumption (i) or (ii) must be given up. For concreteness, suppose that (i) is wrong: Expletive subject *es* dominates the CP in the base. (I.e., the "expletive" *es* is in fact the argument.)

Possible extension to uncontroversial data:
(Zero or overt) expletives might exempt subject infinitives in German from barrier status.

(32) *Extraction from subject infinitives in German* (Haider (1983, 1993), Sternefeld (1985), Grewendorf (1989)):

a. Was$_1$ hat es sich nicht gehört [$_{CP}$ t$'_1$ PRO t$_1$ zu beanstanden] ?
what$_{acc}$ has it not been proper to object to

b. Was$_1$ hat [$_{CP}$ t$'_1$ PRO t$_1$ zu beanstanden] sich nicht gehört ?
what$_{acc}$ has to object to not been proper

c. Was$_1$ hat sich nicht gehört [$_{CP}$ t$'_1$ PRO t$_1$ zu beanstanden] ?
what$_{acc}$ has not been proper to object to

A similar reasoning:
Bittner & Hale's (1996) treatment of accusative case assignment in terms of abstract pseudo-coarguments

4.4 Pseudo-Melting in Last-Merged Complements?

Recall from section 2.3.2:
(i) Extraction from last-merged complements prima facie poses a problem.
(ii) This problem was solved by postulating probe features (for "natural predicates") which can render a phase head active even *after* the last structure-building (subcategorization) feature has been discharged.
(iii) However, this made it necessary to assume that Agree can evade the PIC (an assumption that is arguably independently motivated, given long-distance agreement).

Alternative:
(i) Perhaps *read*, as a lexical property, is accompanied by an empty pseudo-melting expletive (at least in the context of *book*), whereas *steal* is not.
(ii) Perphaps *think*, as a lexical property, subcategorizes for an empty pseudo-melting expletive in addition to its CP complement, whereas *know* does not.

Note 1:
This would be at variance with proposals according to which there is *more structure* with non-bridge (e.g., factive) verbs than there is with bridge verbs; see the additional "operator of some sort" in Manzini (1992, 115), also Roberts & Roussou (2002).

Note 2:
Both bridge verbs like *glauben*, *denken* and non-bridge verbs like *wissen* can co-occur with overt expletive *es*. Assuming that such an overt expletive does not improve extraction (but see above), it must be postulated that *es* either dominates its "associate" CP in the base, or is merged in a different projection. (I assume the former.)

A further consequence:
To maintain barrier status of subjects in Specv and SpecT (and of indirect objects in SpecV), an

additional restriction on pseudo-melting expletives is necessary; e.g.:

(33) *Restriction on subcategorization features* (tentative, possibly parametrized):
A subcategorization feature that does not go back to a θ-grid can only be dominated by at most one subcategorization feature on a feature stack of a lexical item.

Note:
(i) This (trivially) permits a subcategorization feature for VP on v ([•V•]), for vP on T ([•v•]), for TP on C ([•T•]), none of which go back to θ-grids.
(ii) This permits subcategorization features for expletives if there is only one other XP in the same phase that has been merged earlier (as in English *there* constructions, or in pseudo-melting analyses of transparent last-merged complements).
(iii) This does not permit subcategorization features for expletives with subjects and indirect objects. (As such, (33) is incompatible with the approach to putative subject clause transparency in German sketched above.)

5. Movement-Related Morphology

5.1 Hypothesis

Hypothesis:

- Movement-related morphology is not a reflex of successive-cyclic movement.
- Movement-related morphology is introduced as a last resort so as to avoid an island violation with last-merged XPs (typically complements) where probe features (that would keep the phase head active, and accessible as a target for edge feature insertion) are not available.

5.2 Complementizer Selection in Modern Irish

5.2.1 Data

Ref.: McCloskey (1979, 2002)

Observation:
(i) The regular form of declarative C is *go*.
(ii) If SpecC is targetted by movement, C takes the form *aL*.
(iii) (If a long-distance dependency is expressed without movement, by a resumptive pronoun in situ, C takes the form *aN*.)

(34) *Movement-related morphology of C in Modern Irish*:

a. Creidim gu-r inis sé bréag
I-believe C:*go*-PAST tell he lie
'I believe that he told a lie.'

b. Céacu ceann$_1$ a dhíol tú t$_1$?
which one C:*aL* sold you
'Which one did you sell?'

c. an t-ainm OP$_1$ a hinnseadh dúinn a bhí t$_1$ ar an áit
the name C:*aL* was told to us C:*aL* was on the place
'the name that we were told was on the place'

Analysis in McCloskey (2002, 203):
(i) C which bears both the Op-feature and the EPP-feature is realized as *aL*.
(ii) C which bears only the EPP-feature is realized as *aN*.
(iii) C which bears neither the Op-feature nor the EPP-feature is realized as *go*.

5.2.2 Sketch of an Analysis

Pseudo-melting analysis:
(i) VP and vP are inherently transparent in Modern Irish, either because they are not last-merged in their projections, or because they are status-governed last-merged complements.
(ii) Suppose that TP is not inherently transparent in Modern Irish: It is the last-merged complement of C, and C does not have a probe feature for T that might keep it active after TP is merged.
(iii) TP should then qualify as a barrier in Modern Irish.
(iv) As a last resort strategy, a subcategorization feature for an expletive item can be inserted on C.
(v) This creates a pseudo-melting effect: TP becomes transparent because an edge feature can now be instantiated on C that attracts an item in the edge domain of T.
(vi) The expletive that is required by the newly added expletive feature on the phase head is merged in the C domain.
(vii) The expletive is a functional category. Functional categories are mere bundles of morpho-syntactic features in syntax; they are subject to post-syntactic morphological realization (see Halle & Marantz (1993)).
(viii) Post-syntactic morphological spell-out can affect *subtrees*, not just *nodes* (see Ackema & Neeleman (2003, 2004), Neeleman & Szendröi (2006), Caha (2008), Taraldsen (2008), among others). Alternatively, there is *fusion* (see Halle & Marantz (1993), Halle (1997)).
(ix) As a result, the expletive in the outer SpecC position can only be spelled out together with C (see Lahne (2007)).
(x) Bare C is realized as *go*, expletive+C is realized as *aL*.

In a nutshell:

1. TP is a barrier in Modern Irish.
2. To remove barrier status, an expletive is added to C: pseudo-melting.
3. The pseudo-melting expletive is the locus of movement-related morphology.

Note:
This approach raises a number of questions:

- How can the syntactic last resort effect be implemented technically?
- How does post-syntactic morphological spell-out in the C domain work technically?

5.2.3 Movement-Related Morphology as a Last Resort in Syntax

Observation:
Intermediate steps of successive-cyclic movement by themselves are already last resort operations. There are two possibilities to implement this in an optimality-theoretic system:

- Intermediate movement steps are not feature-driven; they violate the LAST RESORT requirement that all operations are feature-driven in order to satisfy higher-ranked constraints (Heck & Müller (2000, 2003)):
  FEATURE CONDITION, INCLUSIVENESS ≫ EOC ≫ LAST RESORT
- Intermediate movement steps are driven by edge features which are inserted on phase heads in the course of the derivation; they violate the INCLUSIVENESS CONDITION in order to satisfy higher-ranked constraints (standard minimalist approach; the present analysis):
  FEATURE CONDITION, LAST RESORT ≫ EOC ≫ INCLUSIVENESS

(35) a. FEATURE CONDITION: triggers discharge of all structure-building and probe features
b. LAST RESORT: blocks syntactic operations that are not feature-driven
c. EMPTY OUTPUT CONDITION (EOC): is the only constraint violated by the null parse: an optimal empty output models a crash of the derivation
d. INCLUSIVENESS: blocks insertion of material that is not part of the numeration, as in Chomsky (2001)

Observation:
(i) Edge feature insertion violates INCLUSIVENESS.
(ii) Expletive feature insertion violates INCLUSIVENESS.
(iii) Insertion of the expletive also violates INCLUSIVENESS.

Analysis:
(i) INCLUSIVENESS is a regular DEP constraint in optimality theory.
(ii) We can distinguish between DEP(feature) and DEP(category): INCL([•X•]), INCL(XP)
(iii) Only when all INCL constraints are ranked below EOC can pseudo-melting (hence movement-related morphology) arise.

Problem:
As it stands, the system seems to require look-ahead: If a language has the option of saving an otherwise illegitimate extraction from a last-merged complement by expletive insertion (i.e., pseudo-melting), it has to make use of it: If it doesn't, no edge feature can be inserted for an item in the last-merged complement, and a PIC violation will subsequently arise. However, the derivation may continue for a while before this can actually be seen (e.g., subsequent phase heads also fail to insert an edge feature, and the PIC problem only arises at what might be the very last step, when the phase head of the ultimate landing site becomes active). Thus, given the PIC-based analysis, an INCL-violation may be required early on but turns out to be legitimate only much later in the derivation. (This problem is well known in local derivational approaches to syntax: *resumptive pronouns*. And the same problem of course also arises with edge feature insertion as such, given that it violates INCLUSIVENESS.)

Solution:
There is a local way of determining whether an INCL violation will or will not pay off: PHASE BALANCE (Heck & Müller (2000, 2003)).

(36) PHASE BALANCE (PB):
Every phase P has to be balanced: If P is a phase then for every movement-inducing feature [•F•] in the numeration there must be a distinct accessible matching goal for F.

Note:
PB can take over the role of the PIC in the analysis of CED effects: Edge feature insertion as such continues to be optional, but if it does not take place, a fatal PB violation with non-accessible δ on the Γ cycle will result (rather than a fatal PIC violation on the YP cycle, as assumed so far), in (37).

(37) ... $[_{YP}$ ... Y $[_{\Gamma}\ \gamma\ [_{\alpha}\ \delta$ ...

Consequence:
Domains for optimizations are local: the phase (i.e., the phrase).

(38) *Some competing CP outputs for movement constructions in Modern Irish*:

a.	$[_{CP}$ C $[_{TP}\ \delta$ ...]]]	→ *!PB.
b.	$[_{CP}$ EXPL $[_{C'}$ C $[_{TP}\ \delta$ …]]]	→ *INCL(XP), *!PB
c.	$[_{CP}\ \delta_1\ [_{C'}$ C $[_{TP}$ t_1 ...]]]	→ *!LR
d.	$[_{CP}$ EXPL $[_{C'}\ \delta_1\ [_{C'}$ C $[_{TP}$ t_1 ...]]]]	→ **INCL([•F•]), *INCL(XP)

Note:
A candidate that proceeds by inserting an edge feature on an inert phase head cannot be generated in the first place, given that the Edge Feature Condition is inviolable. (Alternatively, it could also be assumed to be high-ranked.)

Two problems:

- The additional structure-building feature [•expl•] that creates pseudo-melting must show up *below* the regular (inherent) complement feature on a lexical item. This is just what had to be excluded with inserted edge features. Recall the formulation in (12-b): [•X•] ends up *on top* of γ's list of structure-building features (a pushdown automaton property).
- What exactly does [•expl•] stand for? How do we know what kind of feature has to show up here?

Solution:
(i) The [•expl•] feature arises as a result of *copying* the complement feature: The higher copy then triggers complement Merge, and the lower feature triggers expletive insertion.
(ii) "Expletives" are minimal feature bundles grouped around various kinds of category labels (see Grimshaw (1997)).
(iii) The copying option does not exist for edge features (these are specific features without category information).
(iv) The expletive feature can never attract a category by internal Merge (either by definition, or because of various conspiracies involving, e.g., a ban on extremely anti-local movement from complement position to specifier).

(39) *Pseudo-melting and movement-related morphology*:

	γ: [•β•]
→ (copying)	γ: [•β•] ≻ [•β•]
→ (complement Merge)	γ: [•β•]
→ (edge feature insertion)	γ: [•X•] ≻ [•β•]
→ (Move from compl.)	γ: [•β•]
→ (expl. insertion)	γ: Ø

⇝ optimal output

Complication:
The approach sketched so far works well for languages which have movement-related morphology in all intervening domains, but not in the C domain associated with the final landing site. There are various languages of this type (despite McCloskey's (2002) claims to the contrary). Cf., e.g, *u* as a C realization in Wolof (see Torrence (2005)), and Heck & Müller (2003) for more general remarks. However, Modern Irish is *not* like this: Movement-related morphology also shows up in the final landing site. This poses a problem for the analysis: If C has a [•wh•] feature left at the point where TP is merged, TP cannot be a barrier for extracting an item out of it. Various options arise:

1. The final landing site of movement is actually *above* CP, in a separate projection.
2. McCloskey's own approach: What looks like the moved item is in fact base-generated; the moved item is an empty operator. Under this view, it might simply be that the empty operator gets the same kind of default spell-out as the pseudo-melting EXPL item.
3. C has a [*wh*] probe feature but no [•wh•]; the probe feature alone may be classified as "too weak" to keep a head active once the complement has been merged.

5.2.4 Morphological Spell-Out

Question:
How come the expletive and the C head are morphologically realized as a single unit?

Two options:
(i) post-syntactic spell-out of subtrees
(ii) post-syntactic fusion of expl and C before spell-out of nodes

Note:
Spell-out of subtrees would for the most part work without problems for Modern Irish: At the point where morphological realization of EXPL+C is to take place, the originally intervening δ has already gone on to the next phase, and EXPL and C have become adjacent.

(40) *Derivation with post-syntactic spell-out of subtrees*:

a. $[_{CP}$ EXPL $[_{C'}\ \delta_1\ [_{C'}$ C $[_{TP}\ t_1$ ...]]]] → ... →
b. ... δ ... $[_{CP}$ EXPL $[_{C'}\ t'_1\ [_{C'}$ C $[_{TP}\ t_1$ ...]]]]

Potential complication:
As noted, movement-related morphology in Modern Irish also shows up in the final landing site.

For this last step, it might be that actual dislocation of the expletive to the position of C is required (otherwise, the moved item would intervene; but recall the various options discussed above). For concreteness, I will assume option (ii).

(41) *Derivation with post-syntactic fusion of* EXPL *and C*:

a. $[_{CP}$ EXPL $[_{C'}\ \delta_1\ [_{C'}$ C $[_{TP}\ t_1$ ...]]]] → ... →
b. ... δ ... $[_{CP}$ EXPL $[_{C'}\ t'_1\ [_{C'}$ C $[_{TP}\ t_1$ ...]]]] →
c. ... δ ... $[_{CP} - [_{C'}\ t'_1\ [_{C'}$ EXPL+C $[_{TP}$

Question:
How exactly does morphological realization take place?

Answer:
(i) Given fusion, the feature specifications of EXPL and C are combined into a single feature specification that is targetted only once by spell-out.
(ii) Since the feature specifications of EXPL and C are different from the original C specification, it is likely that different morphological exponents will realize the two specifications: This accounts for the movement-related morphological effect.

(42) *Simplified analysis of Modern Irish*:

a. C bears the features F_1, F_2.
b. EXPL bears the feature F_3.
c. EXPL+C bears the features F_1, F_2, F_3.
d. *go* ↔ F_1, F_2.
e. *aL* ↔ F_1, F_2, F_3.

Consequence:
(i) *go* is the most specific compatible exponent for C alone (*aL* is more specific, but not compatible because it has an additional feature), and is therefore chosen via the Subset Principle (Elsewhere Principle) if EXPL is not present.
(ii) *aL* is the most specific compatible exponent for EXPL+C, and is therefore chosen via the Subset Principle (Elsewhere Principle) if EXPL has undergone fusion with C.

Observation (Lahne (2008)):
It seems that, across languages, movement-related morphology typically involves a *retreat to the general case* (Halle & Marantz (1993)): A less specific (default) exponent is inserted.

Lahne's (2008) approach:
(i) It is the edge feature itself that gives rise to movement-related morphology.
(ii) Edge features, once assigned, are integrated into the phase head's feature specification in such a way that they combine with some specific feature(s) found there.
(iii) By triggering movement, the 'fused' edge feature is deleted, and with it a part of the original feature specification of the phase head.
(iv) The feature that is deleted (as part of the edge feature) is not available for post-syntactic morphological realization anymore: *impoverishment* in the syntax.

(v) Consequently, a less specific, default exponent is chosen by spell-out.

A potential alternative:
The Subset Principle is replaced by the *Superset Principle* (Starke (2006), Caha (2007, 2008), Taraldsen (2008)). In Superset Principle-based approaches to morphological realization, default exponents are those with more features (rather than those with fewer features).

(43) *Superset Principle*:
The phonological exponent of a vocabulary item is inserted into a node if the item matches all or a superset of the grammatical features specified in the node. Insertion does not take place if the vocabulary item does not contain all features present in the node. Where several items meet the conditions for insertion, the item containing fewer features unspecified in the node must be chosen.

(44) *Example: Inflection of "be" in English*:

	Singular	Plural
1	am	are
2	are	are
3	is	are

(45) *Feature decomposition*:
participant, addressee, group, present

(46) *Exponents*:
a. /am/ ↔ [pres,part]
b. /is/ ↔ [pres]
c. /are/ ↔ [pres,part,addr,group]

(47) *Competition*:

Features	Ø	Group
part	am ~~are~~	are
part,addr	are	are
Ø	is ~~am~~ ~~are~~	are

Note:

- The default exponent is overspecified.
- The exponents that block its insertion in certain environments have fewer features.
- The feature specification of a vi does not have to be coherent, or capture a natural class of instantiations of a grammatical category.

Back to movement-related morphology:
Lahne's observation can be accomodated in the present system if the Superset Principle governs morphological realization: Fusion of EXPL and C blocks the regular exponent for C (which now does not realize a superset of the feature specification of EXPL+C anymore), and forces insertion of the less specific default exponent (which does realize a superset of EXPL+C but is blocked in bare C contexts as not being specific enough).

5.3 MeN-Deletion in Malay

Ref.: Cole & Hermon (2000), Fanselow & Ćavar (2001)

Observation (Cole & Hermon (2000, 110)):
Overt movement of a *wh*-argument NP or NP operator requires the omission of the *meN*-prefix on the verb in Bahasa Melayu. (It therefore looks as though *wh*-in situ does not involve overt movement; but cf. Fanselow & Ćavar (2001) for a reanalysis.)

(48) a. Ali mem-beritahu kamu tadi [Fatimah mem-baca apa$_1$] ?
Ali meN-told you just Fatimah meN-read what
b. Apa$_1$ (yang) Ali (*mem)-beritahu kamu tadi [(yang) Fatimah (*mem)-baca t$_1$] ?
what dass Ali (meN)-told you just that Fatimah meN-read
c. Ali (mem)-beritahu kamu tadi [apa$_1$ (yang) Fatimah (*mem)-baca t$_1$] ?
Ali (meN)-told you just what that Fatimah meN-read

Sketch of an analysis:
(i) AspP intervenes between vP and TP in Malay.
(ii) Asp does not status-govern vP, and by itself, Asp does not take a specifier.
(iii) Given low-ranked INCL constraints, expletive insertion is possible in SpecAsp.
(iv) This creates a transparency of vP: pseudo-melting.
(v) *meN* is the standard realization of Asp; fusion of EXPL and Asp makes *meN* insertion impossible (via the Superset Principle).
(vi) Consequently, a zero default marker is inserted (as in Lahne (2008)); but the default marker is radically overspecified (given the Superset Principle).
(vii) Alternatively, there may simply be no exponent available for insertion.

(49) *Simplified analysis of Malay*:
a. Asp bears the features F_1, F_2.
b. EXPL bears the feature F_3.
c. EXPL+Asp bears the features F_1, F_2, F_3.
d. *meN* ↔ F_1, F_2.
e. Ø ↔ F_1, F_2, F_3

5.4 Complementizer Selection in Kinande

Ref.: Schneider-Zioga (2005)

Observations:
(i) C and EXPL may be subject to separate spell-out: In (50-c), C is realized as *nga*, and EXPL as *kyo*.
(ii) There is *wh*-**agreement**, in the sense that the pieces of movement-related morphology differ, depending on properties of the moved item.

(50) *Movement-related morphology in Kinande (Bantu)*:

a. [$_{CP}$ Ekihi$_1$ [$_C$ kyo] Kambale alangira t$_1$] ?
what that Kambale saw
'What did Kambale see?'

b. [$_{CP}$ Iyondi$_1$ [$_C$ yo] Kambale alangira t$_1$] ?
who that Kambale saw
'Who did Kambale see?

c. [$_{CP}$ Ekihi$_1$ [$_C$ kyo] Marya alengekanaya [$_{CP}$ t$_1$ nga-kyo Kambale asoma t$_1$]] ?
what that Mary thinks C-that Kambale read
'What does Mary think that Kambale read?'

Sketch of an analysis:
(i) To account for (50-c), it can be assumed that EXPL does not necessarily attach to C by *fusion*; an operation like *merger*, *lowering* or *local dislocation* (that leaves the two feature bundles intact) is also an option (see Embick & Noyer (2001)).
(ii) The agreement effect suggests that properties of the moved item may also influence morphological realization. This is to be expected if (a) a moved item's trace may potentially retain morpho-syntactic features, and (b) this trace may also participate in fusion (with only EXPL, in the case at hand).
(iii) An alternative would be to assume that different base positions of the moved items are relevant; see Lahne (2008) on the intricate *wh*-agreement patterns in Chamorro.

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