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The morphology of nominalizations and the syntax of *v*P*

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13.1 Introduction

In a 'pervasive syntax' approach to morphologically complex forms, like that of Distributed Morphology (DM in the following), the analysis and structures proposed for a form must also be contained within the analysis of any structure derived from that form. That is, in the same way that the structural analysis for *Mary left* is contained within the structural analysis for *John said that Mary left*, the structure for *marginalize* must be contained within the structure for *marginalization.*

When morphological structure and semantic composition coincide, as in this example, this is hardly controversial, but in cases where morphological structure is present but the expected semantics is not, as in *transmit* and the car part *transmission*, or as in *organize* and *organization* (a company) the usual approach has been to propose reanalysis and an opaque internal structure in the semantically divergent derived form (also known as 'lexicalization'). In contrast, when syntactic structures have both idiomatic and compositional interpretations, the meaning drift in the idiomatic interpretation has usually not been taken to indicate any fundamental alteration of the syntactic structure associated with the string. *Play with a full deck* participates in the morpho-syntactic structure like a verb phrase, even when its interpretation is not compositional, and it seems clear that chunks of structure larger than

a single syntactic terminal node are able to associate with particular idiosyncratic meanings. When the same point is applied to complex morphological structures, the moral is the same: the structure required by the morphemes must be present even when the meaning of the whole is not compositional. Reanalysis is not necessary to explain idiomatized interpretations in either morphology or syntax.

In English nominalizations, however, one type of meaning shift – from event to result readings – seems to be quite productive and predictable, and hence hardly idiomatic. These meaning shifts do not affect the internal morphological structure of the nominalization, which entails that in a DM approach, the complete structure must be present. However, they do affect the argument structure of the nominalization, ruling out the presence of the internal argument that is mandatory on the event interpretation (Grimshaw (1990)). This challenge to a DM approach to English nominalizations was first laid out in detail in Borer (2003a), as well as in Alexiadou (this volume) and Ackema & Neeleman (2004), and is taken up here. This chapter explores first what that internal structure must consist of, by considering the syntax of verb-particle constructions and their behaviour in mixed nominalizations, then identifies particular verbal morphemes with particular syntactic terminals. This points to certain conclusions about the structure of the verb phrase, and the meaning contributions of certain sub-components. Finally, some discussion is presented about the problem of how to derive the result nominalization meaning, given the necessary conclusion, for DM, that they have verbal syntactic structure contained within them.

The central point is that taking the morphology–syntax relationship seriously strongly constrains what can be proposed in terms of a structural representation of nominalizations.

13.1.1 *DM background*

As noted above, DM proposes to adopt a syntax-based approach to word structure. There are three foundational claims that are relevant to the current discussion:

(1)   a.   DM is *piece-based*: Morphemes are independent entities that occupy terminal nodes of a hierarchical structure built by the syntax with normal syntactic processes.

     b.   DM is *realizational*: The syntactic terminal nodes are fully specified for featural (and semantic) content. Each terminal node receives a pronunciation after the syntax is finished. The terminal nodes are

thus *realized* post-syntactically by morphemes, called 'vocabulary items', (VI in the following).[1]

c. VIs may be underspecified for feature content, and compete for insertion into a terminal node via the Elsewhere Principle. Hence a single VI could win competitions for nodes with quite different syntactic (and semantic) specifications.

The key point, for present purposes, is that wherever you see a morpheme, there must be a corresponding a terminal node in the structural analysis of the sentence.[2] Where you do not see a morpheme, there may or may not be a terminal node filled by a Ø element; this happens all the time in English. But it is at least sure that where you do see a morpheme, there had better be a terminal node.

There are only two broad classes of terminal nodes in DM: roots ($\sqrt{}$s, what Harley & Noyer (2000b) call *l-morphemes,*) and grammatical elements of various kinds (*f-morphemes*).[3] Roots are a-categorial, acquiring a category by virtue of the f-morphemes they are merged with in the syntax. The category-creating f-morphemes are usually labelled with the lower-case version of the lexical category they correpond to: a verbalizer is a v°, a nominalizer is an n°, an adjectivalizer is an a°.

13.2 Some possibilities in the syntactic analyses of process nominals

To begin, let us consider the proposal of Kratzer (1993), Kratzer (1996) concerning the derivation of *-ing* nominals in English. There are several classes of such nominals, first characterized comprehensively by Lees (1960). Here, we will consider only the contrast between the broadly verbal *-ing* forms, the 'ACC-ing' class, and the broadly nominal *-ing* forms, the 'OF-ing' class.[4]

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[1] Here I'll often use 'morpheme' to refer to individual VIs, like *-ed*, *-ation*, *cat*, rather than to the abstract terminal node into which VIs are inserted, although technically DM terminological convention has generally reserved 'morpheme' to refer to the latter (as in 'dissociated morpheme') and VI to the former.

[2] The terminal node may be originally syntactic (that is, have originated as part of the numeration and been added to the structure via syntactic merge), or inserted as a 'dissociated' morpheme/terminal node at morphology, prior to vocabulary insertion (see, for example, Embick (2000)). All the morphemes of concern here, however, seem to have a syntactic origin (except, possibly for *of*; see the note at the end of this section concerning Last-Resort *of*-insertion).

[3] Harley & Noyer (2000b) intended 'l-' and 'f-' to evoke 'lexical' and 'functional', respectively, though they are not strictly speaking to be interpreted as such; 'lexical', in particular, is not a relevant concept within the DM framework.

[4] 'ACC-ing' and 'POSS-ing' gerunds are grouped together here in opposition to '*of*-ing' mixed nominalizations because they both license accusative objects and admit adverbial modification. However,

(2) a. ACC-ing nominalizations   (Lees (1960))
          Belushi('s) foolishly mixing drugs and alcohol was the cause of his death.

      b. OF-ing nominalizations
          Belushi's foolish mixing of drugs and alcohol was the cause of his death

(3) ACC-ing properties:
        Verbal characteristics:
           accusative case assignment, adverbial modification
     OF-ing properties:
        Nominal characteristics:
           of-case assignment, adjectival modification

Kratzer proposed an analysis according to which the difference between the two types had to do with whether the *-ing* suffix is attached above or below a subject-introducing projection that she termed VoiceP. This 'high/low attachment' analysis is essentially a modernized interpretation of Abney's analysis (Abney (1987)).[5] If *-ing* attaches outside the VoiceP, the result is the ACC-ing type; if *-ing* attaches to the VP without a VoiceP, the result is an OF-ing structure. These structures are illustrated below.

Siegel (1997) has shown that they differ in an interesting way with respect to their event reference. OF-ing nominalizations can comfortably appear in achievement-entailing, accomplishment-entailing, and activity-entailing frames (i-a, ii-a, and iii-a, respectively below). POSS-ing gerunds (i-b, ii-b, and iii-b) do not fit in any temporal-content-entailing sentences. ACC-ing gerunds, in contrast, fit in accomplishment-entailing frames (iiic), though not in achievement – or activity-entailing ones (i-c and ii-c). She concludes that accusative-assigning gerunds are progressive AspPs, not nominal at all. This would solve the problem raised below in fn 6, but entails that there are two different *-ing* suffixes, losing the insight of the 'high-low' approach introduced in immediately below.

  (i)   a. Belushi's mixing of drugs and alcohol takes place here.
        b. *Belushi's mixing drugs and alcohol takes place here.
        c. *Belushi/PRO mixing drugs and alcohol takes place here.
 (ii)   a. Belushi's mixing of drugs and alcohol took place at 3:07 precisely.
        b. *Belushi's mixing drugs and alcohol took place at 3:07 precisely.
        c. *Belushi mixing drugs and alcohol took place at 3:07 precisely.
(iii)   a. Belushi's mixing of drugs and alcohol takes an hour.
        b. *Belushi's mixing drugs and alcohol takes an hour.
        c. Belushi mixing drugs and alcohol takes an hour.

  [5] Alexiadou (this volume) presents a similar type of syntactically-based analysis for Greek de-verbal nominals, where the different positions correlate with differences in the nominalizing morphology.

(4)   a.

```
        nP
       /  \
     n°    VoiceP
      |    /    \
     ing  DP    Voice′
          △    /     \
       Belushi Voice+acc  VP
               |        /    \
               Ø       V     DP+acc
                       |      △
                      mix   drugs and
                            alcohol
```

'PRO/Belushi('s) mixing drugs and alcohol'

b.

```
        nP
       /  \
     n°    VP
      |   / | \
     ing V (of) DP
         |  (of) △
        mix    drugs and
               alcohol
```

'(the/Belushi's) mixing of drugs and alcohol'
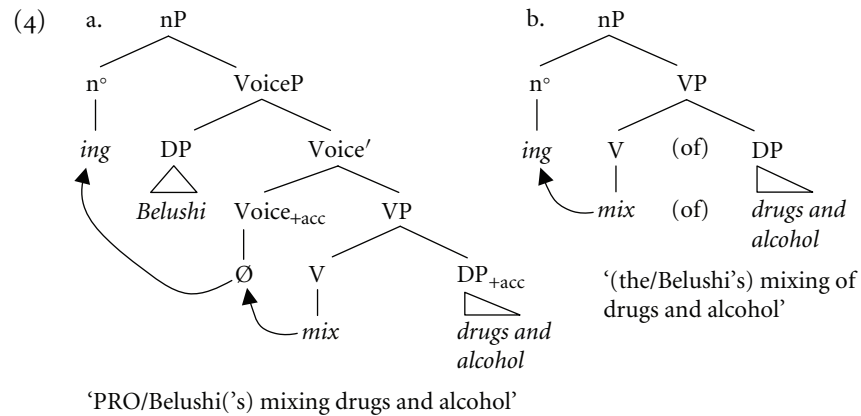
The assumptions underlying this approach are that accusative case, as well as the subject theta-role, is associated with the Voice head – thus deriving Burzio's generalization. The necessity of Last-Resort *of*-insertion in the OF-ing cases, then, results from the absence of the VoiceP, and hence the absence of accusative case in the structure. (In the structure in (4)a, the external argument must be case-marked by some higher projection, possibly a 'gerund' head).

In (4)b any 'external argument' is a simple possessor, introduced in Spec-DP in the normal way. It is not assigned the Agent theta-role, but rather is composed with the event nominal via the familiar 'possessive nexus' – an underspecified relationship licensed by the possessor relationship. In (4)a, the external argument receives an Agent theta-role from Voice and must be interpreted as such. In (4)b, while an Agent interpretation is available for a possessor such as *Belushi*, so too is any other suitable association, for exampe a mixing of drugs and alcohol carried out on Belushi's behalf by some intermediary. This type of associative interpretation for *Belushi* is unavailable in (4)a. See Marantz (1997), among many others, for further discussion of the underspecified semantics of the possessive nexus.

It was immediately natural to associate Kratzer's external-argument-introducing VoiceP with Hale and Keyser's agent-introducing outer VP shell, or Chomsky's agent-introducing vP shell. Distributed Morphologists (Harley (1995), Marantz (1997)) also identified the verbalizing v° head with the external-argument introducing vP shell, so that in Kratzer's structures in (4), the lower VP head could not appropriately be termed a VP anymore – the head projecting it would be an acategorial root, rather than a proper verb. It would only be after the lower $\sqrt{}$ affixed itself to the upper v° via head-movement that the resultant complex head could be called a 'verb.'

This latter conflation of Voice° with the verbalizer v° seemed to offer some promising leverage on the verbal vs. nominal properties of the two types of gerund. If VoiceP is the same as DM's verbalizing vP, then its presence in (4)a accounts for the verbal categorical properties of ACC-ing gerunds, especially their ability to take adverbial modification, include auxiliary sequences, and so on – the verbal characteristics of these gerunds would follow because there is a genuine verb in the structure, created by the presence of the Voice°/v° head.[6] The absence of this head in (4)b, on the other hand, accounts for the emphatically nominal characteristics of OF-ing nominalizations – allowing adjectival modification, not permitting auxiliaries, permitting determiners, and so on. The absence of Voice°/v° would entail that at no level would the OF-ing structure ever be fully verbal.[7]

Harley & Noyer (1997) proposed to extend Kratzer's approach to account for another syntactic difference between OF-ing and ACC-ing structures. ACC-ing structures continue to exhibit fully verbal behaviour when they are formed from verb-particle complex predicates, namely, they continue to allow particle shift. OF-ing structures, on the other hand, do not permit particle shift. This is illustrated in (5) below: (5)a–b show the basic particle-shift phenomenon; (5)c–d show that particle shift is possible in ACC-ing gerunds, and (5)e–f show that particle shift is degraded in OF-ing nominalizations, as first noted in Chomsky (1970).

(5)   a.   Chris **wrote** the paper **up**.

b.   Chris **wrote up** the paper.

c.   Chris writing the paper up so quickly surprised Pat.

d.   Chris writing up the paper so quickly surprised Pat.

e.   *Chris's **writing** of the paper **up**.

f.   Chris's **writing up** of the paper.

Harley & Noyer (1997), following the proposals of Johnson (1991) and Koizumi (1993), proposed an analysis of particle shift based on two key factors: (a) short

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[6] There is a problem with this approach, however: If *-ing* in 2a is same n° *-ing* as in 2b, the analysis doesn't obviously help with the unavailability of determiners and adjectival modification – if it is the same nominalizing *-ing*, then one would expect that, from the outside, the ACC_ing gerunds should behave like regular nPs. See fn 4 above. It is possible that the properties of *-ing* differ when it is adjoined within the l-syntactic domain and outside of it; a similar conclusion is reached by Guéron (in press) with regard to the verb *have*. We leave this problem for future work.

[7] VoiceP is the boundary between 'lexical' (idiosyncratic, idiomatic, derivational) operations and 'syntactic' (productive, compositional inflectional) operations in the syntax-based approach. Its presence or absence in particular derivations would be the key to approaching the type of problem raised in Siloni & Preminger (this volume).

object movement to a case-checking position internal to vP, and (b) optional incorporation of the particle into its selecting verb.[8] That analysis is illustrated in (6)–(8) below. The particle + object form a ParticlePhrase constituent – a small clause that provides a result state for the verbal action, much along the lines proposed by Ramchand & Svenonius (2002), and in much work on clausal event structure before and since (see, for example, Giannakidou & Merchant (1999)). The FP is a case-checking position (AgrO in the original analysis) to which all accusative objects in English must move.[9]

(6)   Structure without any movement:
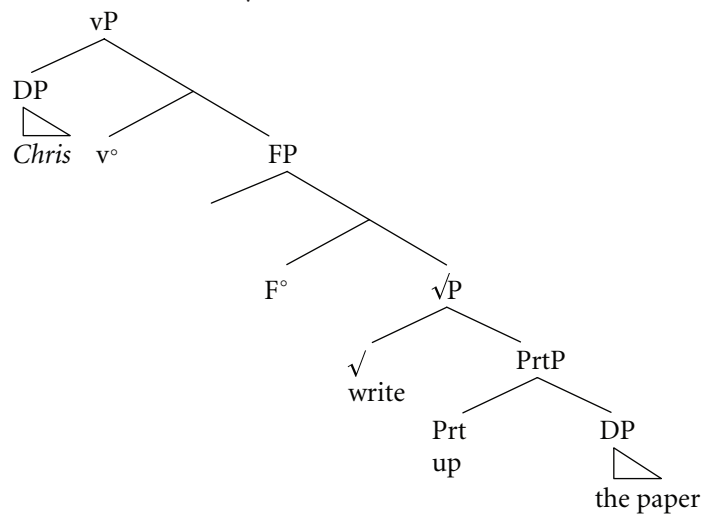
Following head movement of the verb root through F° to v° and movement of the object DP to spec-FP to check its accusative case, the order of terminal nodes will give *Chris wrote the paper up*.

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[8] Dikken (1995) argues that the particle must head its own projection since the particle may be modified like a regular PP, by adverbials like *right* or *straight*: *He wrote the paper right up*. This modification is only possible in the V-O-P order, however; when the particle is adjacent to the verb, it is impossible: **He wrote right up the paper*. On the analysis proposed by Harley and Noyer, this follows because, on the V-P-O order, the V-P sequence is a complex head; the modifier *right* cannot intervene inside the complex head. The modifiable PrtP lower in the structure contains a trace. It remains an open question as to why the trace cannot itself be modified: **He wrote up the paper right* (on the relevant 'quickly' reading).

[9] Koizumi exploits the presence of a purely morpho-syntactic projection like AgrO to account for a well-known but problematic generalization about English syntax: Stowell's Adjacency Condition (Stowell (1981)).

(7)   Chris wrote the paper up.

Assuming that the result-specifying particle may optionally head-move to incorporate into its selecting $\sqrt{}$, and will then subsequently be carried along by head-movement of the $\sqrt{}$ to v°, we can then provide the following structure for the shifted V-P-O order:

(8)   Chris wrote up the paper.

Having established an account of particle shift, let us now turn to the explanation for its failure in OF-*ing* gerunds that Kratzer's approach provides. Let us assume that v° selects for FP. If v° is not present, then FP is not present, and hence accusative case is not present. Applying Kratzer's nominalization proposal to these structures, then, explains why ACC-ing allows particle shift, and why OF-ing doesn't. In the former case, vP and FP are present in the structure. Hence √-to-v° movement and DP movement to Spec-FP will occur, and, combined with optional Prt incorporation, particle shift structures can be generated. In the latter case, on Kratzer's proposal, vP is absent. Hence FP is also absent. Hence, no √-to-v° or short object movement to Spec-FP are possible: in OF-ing nominalizations, the base-generated order is the only possible one. This is illustrated in (9)

(9)
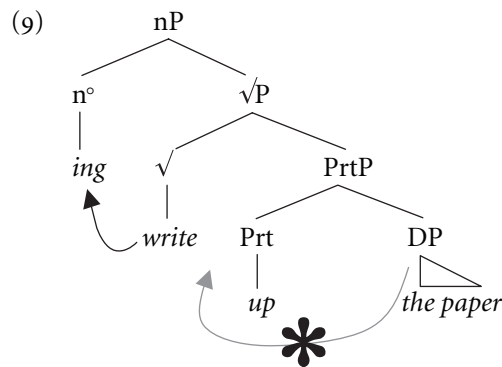
'(The/John's) writing up of the paper'
'*(The/John's) writing of the paper up'

Various kinds of object-licensing projections have been proposed between vP and the lexical verb part of the structure: FP could be equivalent to AgrO, or to AspP, or Ramchand's ProcP, or Borer's AspQP (though see fn. 9). Further, FP has to be absent in the nominalized form for the analysis to work – that is, *of* can not be the realization of the F° head in a nominal context, as for Fu et al. (2001). It is worth noting that Fu et al.'s proposal makes the wrong prediction with respect to ECM in OF-ing nominalizations, namely that it should be possible. The point of Chomsky's classical inherent case treatment of *of* is that it is not available in ECM contexts: *John's belief of Mary to be innocent*. I assume here that *of*-insertion takes place into a 'dissociated morpheme' – a terminal node inserted post-syntactically to ensure morphological well-formedness in certain conditions. (For a discussion of the Raising-to-Object approach to ECM necessitated by the system adopted here, see Lasnik (1999).)

Harley and Noyer assume the same structure for regular event nominalizations, which also have an *of*-licensed object DP:

(10)

```
              nP
            /    \
          n°      √P
          |      /   \
        -ion    √     DP
                |      ◹
            construct  the house
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'(The/John's) construction of the house.'

13.3 English verbalizing morphemes

So, taking seriously the notion that $v°$ is the verbalizing head, there are some obvious candidates for overt $v°$ morphemes in English. Among others, there are the verbalizing affixes *-ify, -en, -ize,* and *-ate*. These can combine with roots or stems to form verbs, most obviously verbs with a causative reading, as illustrated in (11):

(11)   Causative meanings

   a.   horrify, gratify, justify, certify, specify, vilify, simplify, passify, objectify]

   b.   deafen, dishearten, dampen, sadden, neaten, coarsen

   c.   categorize, terrorize, alphabetize, categorize, customize, digitize, idolize

   d.   complicate, calculate, commemorate, pollinate, decorate, regulate, disambiguate

Given that we take $v°$ above to be equivalent to Kratzer's external-argument-introducing Voice head, or to Hale and Keyser's agent-introducing V head, CAUSE seems like the right kind of meaning for a verbalizer to have. It will introduce the external argument and assign it an Agent or Causer interpretation, and select for some sort of result-state-denoting $\sqrt{}$P complement (see Giannakidou & Merchant (1999) for an articulated semantics for the $v°$ and $\sqrt{}$ heads in analogous cases in Greek):

(12)
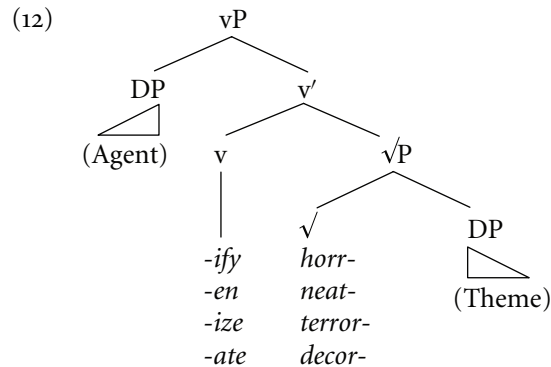
However, these verbalizers aren't restricted to causative-only environments, as pointed out by Sawai (1997). They may all occur on inchoative/causative alternating verbs. On the inchoative use, of course, these have no Agent argument:

(13)   Inchoative/causative alternators

    a.   coagulate, activate, detonate, dilate, oscillate, correlate, levitate, separate

    b.   gentrify, emulsify, clarify, unify, petrify, solidify

    c.   awaken, broaden, whiten, deaden, darken, flatten, freshen, lighten, loosen, ripen

    d.   crystallize, caramelize, concretize, capsize, depressurize, fossilize, ionize, stabilize

Furthermore, *-ate*, *-ify*, and *-ize* (but not *-en*) all occur on a few purely unaccusative verbs, with no causative alternant:

(14)   Unaccusatives

    a.   capitulate, deteriorate, gravitate, stagnate

    b.   qualify, stratify, putrefy

    c.   acclimatize, metastasize, naturalize, specialize

Finally, *-ate*, *-ify*, and *-ize* (but not *-en*) all occur on unergative activity verbs as well (contra Sawai (1997)):

(15)   Unergatives

    a.   dissertate, elaborate, ejaculate, commentate, hesitate, undulate, lactate, vibrate

    b.   testify, speechify

   c.   cognize, concertize, fraternize, fantasize, harmonize, temporize, sympathize

Nonetheless, they are all verbalizers, so in DM they should all be instances of $v°$. Harley (1995) and Marantz (1997) make clear the need for a $v°$ head to be present in unaccusative verbal structures as well; this $v°$ head would have a different semantics than the external-argument-introducing verbalizer – something closer to 'become' than 'cause'.[10] There must therefore be different varieties, or 'flavours,' of $v°$, all serving the verbalizing function, but expressing distinct meanings to do with the initiation or lack thereof of the verbal event. Harley (1999), Harley (2005) and Folli & Harley (2006), Folli & Harley (2007) further characterize a stative $v°$, v_{BE}, and an agentive (rather than causative) activity-denoting $v°$, v_{DO}. The $v°$, then, is the locus of the eventive vs. stative distinction in verb types, as well as the distinction between caused or spontaneous events, and the distinction between activity events and change-of-state events. Assuming these distinctions in $v°$ can be morphologically characterized in terms of feature clusters such as [±dynamic], [±change.of.state], [±cause], then we could capture the distribution of the verbalizing affixes via underspecification in the usual DM fashion.[11] (See Rosen (1999: 4–5)

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[10] Note that it is straightforward to characterize the relationship between a BECOME operator and a CAUSE operator: the former is just the latter without an external argument – a 'Process' functor without an 'Init' functor, in the terms of Ramchand (2008). In the analysis of Giannakidou and Merchant, the BECOME predicate could have a denotation like the following, substituting a monovalent predicate UNDERGO for the bivalent DO predicate:

(i) $[[\text{-izo}_{BECOME}]] \Longrightarrow \lambda P \lambda x.\exists e[\text{UNDERGO}(e,y) \ \& \ \exists s[P(s,y) \ \& \ \text{CAUS}(e,s)]]$

Of course, in the syntax proposed here, the object y composes with the result state P before the resulting complete predication is composed with the BECOME $v°$ head (spelled out as *-ize* etc.); in G&M's proposal, the $v°$ and P heads compose first and then are merged with the object. Consequently, G&M's semantics are not strictly compatible with the structural proposal here. The actual v_{BECOME} predicate shoud take saturated state of affairs P as an argument and assert the existence of an event in which ¬P changes to P, along the lines in Dowty (1979). Given such an explicit semantic account, a mapping between the features which condition the insertion of VIs *-ize/-ify/-ate* etc. and the LF interpretation of the terminal nodes they realize could be provided. In the ideal world, perhaps, the semantic content itself could condition VI insertion, but given that this seems unlikely to work out in other areas (for example, in formally plural but semantically singular *pluralia tantum* forms like *scissors*), it is unclear that morphosyntactic feature content can be entirely eliminated in favour of semantic representations.

[11] Since these features are in an implicational relationship, it might be that they are organized geometrically, with the attendant consequences for underspecifcation of VIs, and fewer possible distinctions.
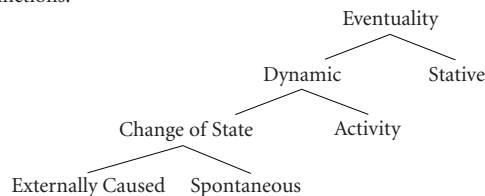
and citations therein for similar featural analyses of the various Vendlerian event classes. In addition, here, the additional [±cause] feature is necessary to characterize the distinction between v° with and without external arguments.) In (16), a possible feature specification characterizing each 'flavour' of v° is given:[12]

(16) a. v_{CAUS} [+dynamic], [+change of state], [+cause]

   b. v_{BECOME}: [+dynamic], [+change of state], [−cause]

   c. v_{DO}: [+dynamic], [−change of state], [−cause]

   d. v_{BE}: [−dynamic], [-chage of state], [−cause]

In 13.4, the VIs for the four verbalizers described above are given, showing which features condition their insertion. Underspecification for [±cause] ensures that they will be able to realize v° in its v_{BECOME} flavour as well as its v_{CAUS} flavour; further, the underspecification of -*ify*, -*ize*, and -*ate* for [±change of state] ensures that they will be able to realize v° in its v_{DO} flavour as well; hence predicting the range of event types possible with each suffix. Each suffix necessarily also comes with a list of stems to which it can attach, as well, since in no case is any of these suffixes a completely productive 'Elsewhere' verbalizer. In English, the Elsewhere v° VI is Ø.

(17) a. -*en*[13] ↔ [$_{v°}$ [+dynamic], [+change of state]] / [$_A$ {flat, dead, white . . . }] _____

   b. -*ify* ↔ [$_{v°}$ [+dynamic]] / [$_√${hor-, clar-, glor- . . . }] _____

   c. -*ize* ↔ [$_{v°}$ [+dynamic]] / [$_√${categor-, terror-, alphabet- . . . }] _____

   d. -*ate* ↔ [$_{v°}$ [+dynamic]] / [$_√${complic-, decor-, regul- . . . }] _____

This is all very well, but it leads to a serious and obvious conflict for the OF-nominal analyses above, which is what we turn to next.

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[12] A similar proposal could account for the morphological difference in German between inchoative *enden,*'end (intr)' and causative *beenden* 'end (tr)' discussed by Bierwisch (this volume): The v_{BECOME} head would be realized as a -Ø VI in the context of ENDEN, while the v_{CAUSE} morpheme would have a -*be* VI realizing it in the same context. Such morphological differences can thus be straightforwardly accommodated within the DM framework.

[13] This analysis does not predict that -*en* cannot occur in non-alternating unaccusative stems – the [+change of state] feature specification does not require that a given verb alternate with a causative form, but just that it involve a change of state, as most or all purely unaccusative verbs do. There are two possible approaches to the apparent absence of non-alternating unaccusative -*en* verbs: (a) it is an accidental gap, which could in principle be occupied (perhaps *smarten (up)*, as used in my father's English, is such a form, or (b) there is some characteristic of purely unaccusative verbs that is not captured by the present feature inventory, perhaps [±durative] – many purely unaccusative verbs (*arrive, die*) are achievements, not accomplishments. If that were the case, then -*en* could be specified for [+durative] environments only, and hence be excluded from purely unaccusative verbs.

## 13.4 The morphology of [[[[nomin]$_\sqrt{}$al]$_A$iz]$_V$ation]$_N$

The problem is that all these verbal suffixes occur perfectly happily inside
nominalizing affixes, to create de-verbal nouns that then require *of*-insertion
to license their objects. This is essentially the problem of inheritance noted
by Ackema & Neeleman (2004: Ch. 2), and discussed extensively by Borer
(2003a) and Alexiadou (this volume). If the syntax *is* the morphology, and the
morphology of the verb is present, where are the verb's syntactic properties?
Why, for instance, can't the nominal *nominalization* license accusative case
on its internal argument? Recall that above we assume that *-ize* realizes a v°,
which (when agentive) may select for an accusative-licensing FP. But, also
in the analysis above, it is the absence of a verbalizing v° that accounts for
the need for adjectival rather than adverbial modification, and the possibil-
ity of a determiner or pluralization in OF-ing nominals as well as in other
derived nominals like *destruction*. Yet it is perfectly clear that these derived
nominals can contain verbalizing morphemes like *-ize*. In other words, v°
must be absent to account for the absence of verbal extended projection
properties, but v° must be present to account for the presence of *-ize* within the
nominalization.

Given our discussion of categorizing morphemes above, the structure of the
verb phrase *to nominalize verbs* and its nominalization *(the) nominalization of
verbs* would be as illustrated in (18) below:

(18)   a.   Internal structure of the vP *(to) nominalize verbs*, as in *Linguists
            often nominalize verbs*, on analysis of the vP given in (6) above:
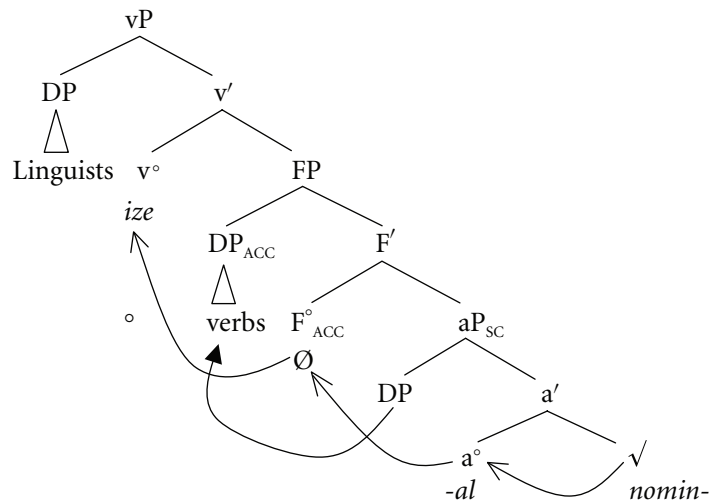
    b.   Given (18), the structure necessarily contained within *the nominalization of verbs*

'(The) nominalization (of) verbs'
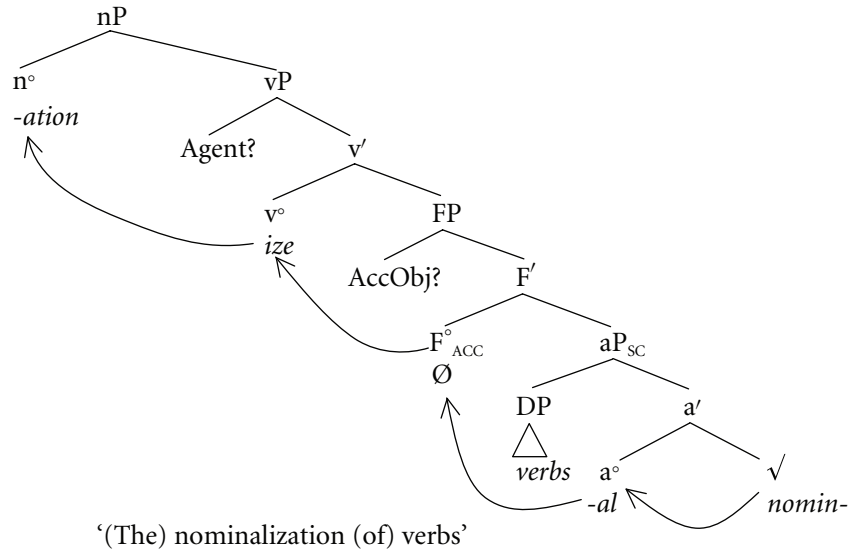
In short, if the verbalizing v° morpheme *-ize* is there, then the nominalizer must be attaching to the vP. If the nominalizer is attaching to the vP, then the external argument and accusative case should be available. They are not available.[14]

    The inevitable conclusion, then, is that the verbalizer v° is not the external-argument-introducing head. Further, the verbalizer v° does not select for the Case-checking head – rather, a separate external-argument-introducing head does.[15] The Agent head and the Case head must project outside the verbalizing

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[14] Fu et al. (2001) in fact do claim that the external argument and accusative case are available in nominalizations, but that approach runs into trouble in ECM contexts as noted at the end of section 13.2 above. I also follow Chomsky (1970), as interpreted in Marantz (1997), in assuming that true verbal external arguments are not available in OF nominalizations, but rather that certain kinds of agency are licensed in the possessive 'nexus', contra Fu et al. and Roeper & van Hout (this volume). If the verbal external-argument introducer were present in nominalizations, the impossibility of #*John's growth of tomatoes,* or Causer external arguments like #*Adultery's separation of Jim and Tammy Faye Bakker* would be mysterious. If Agents, but not Causers ('Stimuli') can license the possessive nexus, however, the discrepancy in types of possible external arguments between verbs and their nominalizations can be accounted for.

[15] I have argued against the presence of an intermediate verbal head in past work (Harley (1995), Harley (2005), for example), and I still feel there are significant puzzles associated with the presence of this intermediate verbalizer. Why, for instance, can it not introduce the external argument, or *some* argument, on its own? Why is there not a distinguishable scope for *again*-type adverbials at this level? Why is there so little morphological attestation of the distinct Voice vs. v° heads cross-linguistically? One doesn't see both v_CAUS and Voice° independently and simultaneously realized in the morphology

v° head, and hence be excludable from nominalizations while still allowing v° to be included. The Agent+Case-head complex, then, takes the verbalizing v° head as its complement – in other words, the complement of VoiceP really is vP, not an acategorial root. The v° is really the lower V head in the split-VP structure; its complement is the SC or event-or-entity-denoting thing which determines the extent of the event via a homomorphism, in the terms of Harley (2005) and Folli & Harley (2006). I assume the v° head is equivalent to the ProcP head of Ramchand (2008).[16]

(19)   Full verbal structure thus far including agent-introducing head
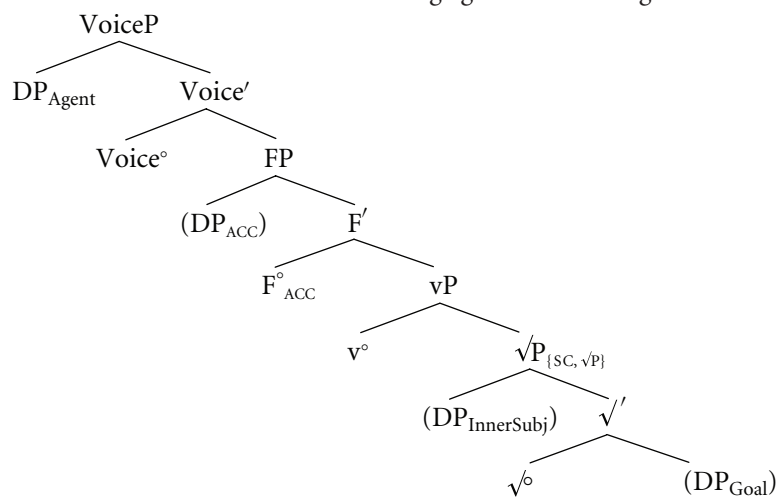
of verbs (Harley (2005)). However, see Marantz (2001a), Pylkkänen (2002), Collins (2005), Merchant (2007), Travis (to appear) and Harley (2007) for additional arguments in favour of VoiceP ≠ vP.

[16] I shudder to confess but an apparent difference between OF-*ing* nominalizations and irregular event nominals in -*tion* and similar affixes may motivate a reorganization of the structure in (19) and yet more structure on top of that. The judgements are unclear, but it seems that OF-*ing* nominals may allow any kind of agent argument – *John's growing of tomatoes, Adultery's separating of Jim and Tammy Faye.* (These NPs improve to perfection in the ACC-*ing* form, but are noticeably better than *growth* and *separation*, to my ear.) Assuming this is not just a garden-path effect, we are faced with a situation where true external arguments are licensed, but not accusative case, nor auxiliary stacking. A structural account of the putative three-way contrast between OF-*tion*, OF-*ing*, and *ACC-ing*, then, could go like this: the accusative-case-checking FP appears outside VoiceP (Chomsky's original placement of AgrO, cf. Chomsky (1995)). OF-*tion* nominals are formed below VoiceP, and do not include a true external argument. OF-*ing* nominals are formed on a VoiceP with no FP above it, thus explaining the availability of true external arguments but the absence of accusative case. In the verbal domain, the placement of the verb to the left of accusative objects, then, would mean that verbs move even higher than FP (which is now above VoiceP) – to an Auxiliary or Aspect head. The true ACC-*ing* gerunds, then, would be formed on this uppermost head (see Alexiadou (2005) for an analysis along these lines). Alternatively, the assumption in Fu et al. (2001) that *of* just IS accusative case as it is spelled out in the nominal domain could be adopted (though cf. the discussion below example (9) and footnote 17).

The structure of *nominalization of verbs,* then, must pretty much be what any morphologist would have told you it was. It includes a verbalizer but excludes the VoiceP and FP:[17]

(20)
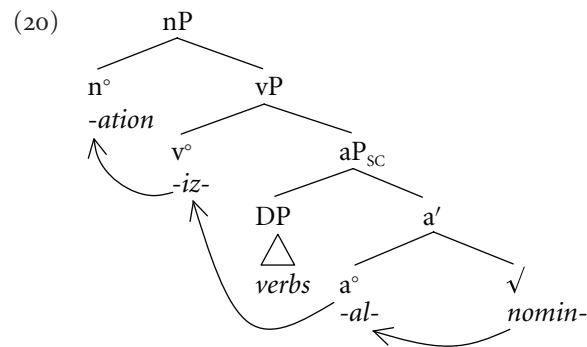
13.5 Process vs. result nominals

We now have a syntactic analysis of nominalizations which can account for the presence of verbalizing morphology but the absence of other syntactic properties associated with the verb phrase. However, we have not yet addressed one crucial aspect of the nominalization equation, namely, the question of whether nominalizations have the verbal *semantics* that above we have associated with the vP. This is the crucial problem addressed by Borer (2003a) in her discussion of this issue, and the central issue is the process vs. result nominal distinction discovered by Grimshaw (1990).

The central results of Grimshaw's typology of de-verbal nouns are summarized in 13.6 below (see also the more comprehensive discussion in Alexiadou (this volume)). Process nominals take arguments (21a), accept aspectual modification, and modifiers like 'frequent' and 'constant', and aspectual

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[17] Recall that that *of*-insertion is impossible in typical ECM-small-clause contexts, as in *John's consideration of Bill a fool*, as noted in the text below example (9); yet a small clause is present in the nominalized structure here in (20), in which *of*-insertion is licensed. Assuming that the treatment of *of*-insertion as a dissociated morpheme outlined below (9) above is correct, this means that the context for the dissociated-morpheme insertion rule is met in small-clause cases like *nominalization* but not in *consideration...a fool*. This could have to do with the clause-union effect of incorporation of the result predicate, or with the fact that a matrix verb like *consider* is itself made up of a $\sqrt{}$+v+Voice, unlike the 'light' matrix complex of v+Voice in cases like *nominalization* here or in resultative small clauses like *writing up of the paper*, or, an example provided by Andrew McIntyre, *drinking dry of the pub*. Thanks to McIntyre for bringing this important question to my attention.

modification, in the singular, (21b, c, d), and do not allow (count) indefinite forms (21e)[18]

(21) a. The assignment of difficult problems (bothers the students.)

  a′. The transformation/#change of the caterpillar (was complete).

  b. The frequent assignment of difficult problems (bothers the students).

  b′. #The frequent problem (bothered the students).

  c. Their performance of the play in only two hours (surprised the critics).

  c′. #Their dance in only two hours (surprised the critics).

  d. Transformation of the caterpillar into a butterfly as rapidly as possible is essential for the survival of the insect.

  d′. #The caterpillar's change into a butterfly as rapidly as possible is essential for the survival of the insect.

  e. #A complete creolization of a pidgin can often occur in a single generation.

The conclusion drawn from all the above is that de-verbal process nominals are mass nouns. So far, so good. The crucial problem arises when these nominals occur without their internal arguments. In this situation they get what Grimshaw termed a 'result' interpretation (Alexiadou (this volume) further subdivides these into 'simple event' nominals and 'result' nominals). They become count nouns, and stop allowing aspectual modification and *frequent, constant*, etc. In other words, process nominals *have* to take their internal argument, just like their corresponding verbs; when the structure associated with the internal argument goes away, they lose their process reading and acquire a different, 'result' semantics.

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[18] Fu et al. (2001) argue that process nominals allow adverbial modification (even though they are *nominals*) and *do-so* replacement, at least contrastively with non-de-verbal event nominals. The judgements are rather iffy (see, for example, the discussion in Ackema & Neeleman (2004: 21–23) and in Newmeyer (to appear); here are the best examples I can come up with:

(i) a. The treatment of the symptoms regularly is important for a good prognosis.

  b. #The therapy for the symptoms regularly is important for a good prognosis.

(ii) a. John's removal of the garbage in the morning and Sam's doing so in the afternoon kept the apartment smelling fresh.

  b. #Bill's revenge on Joe in the morning didn't take long, but Sam's doing so in the afternoon occupied three or four hours.

(22)   a.   #The frequent assignment bothers the students.

     b.   #The performance in an hour surprised the critics.

     c.   #The creolization in a single generation surprised the linguist.

How can we treat these result interpretations, and their sudden absence of obvious event structure, within the syntacticocentric set of DM assumptions? Borer (2003a), working in a very similar framework, concludes that both syntactic and 'morphological' word formation is possible with these suffixes. Syntactic word formation results in an event nominal with internal syntactic structure, a position for the object, etc.; pre-syntactic word formation produces a syntactically atomic N° which has the interpretation of a result nominal. This type of split approach is not possible within DM; to adopt the notion that words can be built either pre- or post-syntactically would make most of the framework's strongest claims vacuous. Because these result nominals retain their full morphological structure, a DM account has to accept that they are fully as internally complex as their event nominal counterparts.[19] The complex morphology also tells us that, even on the result reading, these nominals must contain all that they need to denote complex events – the v° and its complements (minus any arguments). We are forced to the position that some other factor must be interfering with the internal-argument licensing in process nominals. Alexiadou (this volume) proposes that internal arguments may be introduced by a separate functional projection, which may be absent from result nominalizations and hence eliminate the internal argument in the same way that the absence of the Voice head from *of*-nominalizations eliminates the external argument. Below, I outline another possibility, drawing on the fact that result nominalizations, unlike event nominals, are count nouns.

    We know that coercion from a mass to a count interpretation is independently possible in English (*two coffees, those wines, many rains*) – and that different kinds of mass nouns result in different kinds of count interpretations under coercion (*two* (CUPS OF) *coffees, those* (KINDS OF) *wines, many* (SEASONS OF) *rains*). Mass process nominals, when coerced to count nominals (perhaps by a higher, null, 'packaging' head such as Num or Cl), tend to give a result interpretation. The idea that I wish to suggest here is that, in undergoing the coercion from a mass, process-denoting nominal to a count, result-denoting nominal, a semantic side-effect kicks in which rules out the presence of the syntactic object (again, see Alexiadou (this volume) for additional discussion of the relevance of the mass/count transition to the structure of these nominals).

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[19] Note that some languages *do* show major morphological differences between event and result nominals; see, for example, Engelhardt (2000) on Hebrew.

In the structure for the vP proposed above, the object (or resultative small clause containing the object) measures out the duration of the event denoted by the vP, via a Krifka-style Event-Object (or Event-Path) homomorphism. The semantic role of the object in the structure, then, is to provide a boundary for the unfolding of the event.

The role of the count-noun-creating head in coercion of mass nouns to count interpretations (the 'Packager', in Jackendoff's terms, cf. Jackendoff (1991)), is similar. The packaging head imposes a boundary on the mass noun, making it discrete and countable – quantizing it, in Borer's terms, cf. Borer (2005a). I suggest that the presence of a syntactic object is incompatible with the coercion of a process nominal to a count noun because the delimitation imposed by the packager is incompatible with the delimitation imposed by the object (though see Alexiadou (this volume) for a precisely opposing view). In *the nominalization of the two verbs*, the extent of the verbs (two of them) determines the extent of the nominalization event. It goes on until both verbs have been nominalized. When the noun is coerced to a count reading (e.g. *a nominalization (#of two verbs)*), the packager specifies the boundaries of the new meaning, and the object may not play its delimiting role. Hence, if the object is present in the structure, the conflicting interpretations imposed by the two delimiters results in ill-formedness.[20]

It is worth noting that this effect is not confined to verbs with overt nominalizing morphology. Below are presented some simplex (Ø-derived) mass-event Ns which take an argument and which in my judgement accept modification with 'frequent'. I've included for each a 'frequent'-modified occurrence in the wild, courtesy of Google. I've looked at approximately 250 event-denoting nouns, both simplex and derived, that fit in one of Vendler's 'narrow containers', but have not found any mass-event-denoting, argument-taking nouns that accept 'frequent' modification which do not have a related verb. This is consistent with the observation of Zucchi's (as attributed by Grimshaw and cited in Borer (2003a: 47) that no AS nominals exist which are not formed from a verb.

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[20] Andrew McIntyre (p.c.) notes that this account of the infelicity of the object in result interpretations does not explain why the result interpretation allows object-drop, given that process nominalizations enforce the selectional requirements of the verb, and are incompatible with object-drop. If all the structure of the process nominalization is present in the result nominalization, as claimed here, then the same violation should occur if the object is dropped in the result nominalization. I offer two speculations concerning this point. First, it might be the case that the packager head that produces the result interpretation actually checks semantic quantizing features on the verb, and that it is those features which enforce the object requirement in the process interpretation, which, being a mass noun, has no packager head to check those features. Alternatively, it could be the case that, although an overt object is incompatible with the packager's quantizing effect, an implicit null object with non-specific reference (perhaps PRO) is not, and that such a null argument may satisfy the sub-categorization requirements of the verb in the result interpretation.

(23)   the frequent rape of women in Darfur   (My example)
       However, each side did allege **frequent rape of** its women civilians by
       the other's soldiers.   (Google, http://www.asil.org/ilib/ilib0708.htm)

(24)   the frequent collapse of the king   (My example)
       Various manifestations of these phenomena have long been known to
       industry and agriculture, including the **frequent collapse of** grain silos,
       the jamming of hoppers or other equipment.
                       (Google, http://weboflife.nasa.gov/regolith_announce.htm)

(25)   the frequent repair of the motorcycle   (My example)
       Repeated failure to take care of the instrument in this manner will
       necessitate **frequent repair of** the fluidic system, with resultant
       instrument downtime.
                       (Google, http://home.ncifcrf.gov/ccr/flowcore/schedcal.htm)

(26)   the frequent censure of journalists   (My example)
       It is already the case that, because the enforcement of current regula-
       tions requires **frequent censure of** personnel performing special flu-
       oroscopic procedures, many personnel do not comply with existing
       requirements.
                       (Google, www.crcpd.org/SSRCRs/d-rat03.pdf)

(27)   the frequent murder of journalists
                       [contra Borer 2002: 22 as cited by Alexiadou[21]]
       . . . as evidenced by widespread poverty and **frequent murder of** judicial
       and governmental officials.
                       (Google, http://ftp.fas.org/irp/congress/1998_hr/h980610-riutta.htm)

(28)   the frequent capture of illegal immigrants   (My example)
       . . . especially to the marine prisoners, whose numbers were rapidly
       increasing, owing to the **frequent capture of** American privateers by the
       king's cruisers.
                       (Google, http://www.lewrockwell.com/orig/north5.html)

(29)   The frequent defeat of the Korean forces . . .   (My example)
       . . . 'hard-core' partisans . . . are becoming an increasingly larger propor-
       tion of those voting, which contributes to the more **frequent defeat of**
       moderate candidates.
                       (Google, http://annezook.com/archives/000940.php)

[21] Google returns approx 473 hits for 'frequent murder of', vs. 451 for 'frequent murders' (without
of).

(30)   The frequent practice of good brushing habits   (My example)
       The frequent practice of this discipline will enable you to understand
       and know yourself better inside and out.
               (Google, http://yoga.org.nz/benefits/benefits_personal.htm)

(31)   The frequent outbreak of disease in refugee camps   (My example)
       The**frequent outbreak of violence** in Lower Assam is a reminder that . . .
               (Google, http://frontlineonnet.com/fl1520/15201370.htm)

(32)   frequent meltdown of the reactor   (My example)
       . . . the violence of simulated 'true shows', or the **frequent meltdown of**
       sanity and basic civility on talk shows . . .
               (Google, http://people.bu.edu/pstring/4.html)

These nouns, too, when they are coerced count nouns, lose their internal
arguments, or at least become considerably more infelicitious with them:

(33)   a.   a rape (??of a woman)

       b.   a collapse (??of a table)

       c.   a repair (??of a motorcycle)

       d.   ??a censure (?? of a journalist)

       e.   a murder (??of a journalist)

       f.   a capture (??of a prisoner)

       g.   an outbreak of disease

       h.   a meltdown (??of a reactor)

If these nouns are just regular complex event nominalizations with a null
nominalizer, they can't tell us anything different than argument-taking nouns
like *destruction of the city* can. Testing them with temporal modifiers is some-
what inconclusive ('The capture of the prisoner in only three hours' seems
fine, but '??The repair of the motorcycle in only three hours' is quite odd to
my ear, for example).[22] If they *are* genuine examples of structurally simplex

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[22] On the other hand, the fact that the only cases of such simplex nouns all have related verbs
suggests that they are likely to be de-verbal in the relevant way, i.e. they are complex nominals with
null nominalizing morphology, as noted by Hagit Borer (p.c.). Alexiadou (this volume) lends weight
to this hypothesis with the observation that all these nominals share another characteristic, namely,
they all form part of the borrowed Romance vocabuary.

   Andrew Mcintyre (p.c.) notes an interesting definiteness effect when eventive *of*-nominalizations
are compared to their synthetic compound counterparts. The *of*-nominalization prefers to be definite,
while the synthetic compound rejects a definite determiner – the presence of the determiner results in
a definite ESL feel to the example:

 (i)   ?(The) smoking of weed during plenary talks is not allowed at this conference.

event nominals, however, then they can tell us something, namely, that when an argument-taking mass-event nominal without any internal verbal structure is transformed into a count noun, it loses its internal argument. That is, perhaps these nominals suggest that the licensing of *of*-marked argument NPs is blocked by the count-noun-deriving process, rather than by loss of internal verbal structure.

13.6 Conclusions

In a framework in which every piece of morphology must have a structural correlate, morphology can guide our conclusions about syntax and semantics, and vice versa. In order to avoid vacuity, however, morphology must be taken seriously: complex morphological structure cannot just be ignored when it seems to be making odd syntactic and semantic predictions. In this chapter, I have presented nominalizations as a test case of this hypothesis, using syntactic facts to derive conclusions about the morphology (position of nominalizers in the structure), and then using morphological facts to derive conclusions about the syntax (position of verbalizers within nominalizations). Like any strong hypothesis, this one can lead to difficulties when pushed to its logical conclusion; I hope to have at least suggested that the particular difficulty posed by the puzzle of result nominalizations may have a plausible explanation within the bounds of the theory.

(ii)   (*The) weed-smoking during plenary talks is not allowed at this conference.

This effect carries over to these simplex event-nominal cases, comparing the *of*-insertion form to an equivalent event-denoting compound:

(iii)   ?(the) repair of motorcycles/?(the) meltdown of reactors

(iv)   (*the) motorcycle repair/(*the) reactor meltdown
        (* on the event interpretation only)