Verbs, nouns and affixation[*]

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What explains the rich patterns of deverbal nominalization? Why do some nouns have argument structure, while others do not? We seek a solution in which properties of deverbal nouns are composed from properties of verbs, properties of nouns, and properties of the morphemes that relate them. The theory of each plus the theory of how they combine, should give the explanation.

In exploring this, we investigate properties of two theories of nominalization. In one, the verb-like properties of deverbal nouns result from verbal syntactic structure (a "structural model"). See, for example, van Hout & Roeper 1998, Fu, Roeper and Borer 1993, 2001, to appear, Alexiadou 2001, to appear). According to the structural hypothesis, some nouns contain VPs and/or verbal functional layers.

In the other theory, the verbal properties of deverbal nouns result from the event structure and argument structure of the DPs that they head. By "event structure" we mean a representation of the elements and structure of a linguistic event, not a representation of the world. We refer to this view as the "event model". According to the event model hypothesis, all derived nouns are represented with the same syntactic structure, the difference lying in argument structure – which in turn is critically related to event structure, in the way sketched in Grimshaw (1990), Siloni (1997) among others.[1]

In pursuing these lines of analysis, and at least to some extent disentangling their properties, we reach the conclusion that, with respect to a core set of phenomena, the two theories are remarkably similar – specifically, they achieve success with the same problems, and must resort to the same stipulations to address the remaining issues that we discuss (although the stipulations are couched in different forms).

1.   Nouns and argument structure: Basic patterns

As shown by Grimshaw (1990), de-verbal nouns do not form a homogeneous class. Some of them license argument structure and some do not. We do not repeat the details of the arguments here, but summarise the general points. The central point for present purposes is that arguments are *required* only by deverbal nouns with *complex event interpretations*. This property, like further differences between complex event nominals and other deverbal nouns, is obscured by the fact that many nouns are ambiguous, and can even have three interpretations, showing different behaviour under each. As (1) illustrates, nouns such as

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[1] We simplify here by treating event structure as a property of verbs, rather than as a property of verbs in combination with their complements.

examination are three way ambiguous. They can have a "complex event reading" as in (1a), a "simple event reading" as in (1b), in which they denote an event but are not associated with an event structure and hence not with an argument structure, and a further reading in which they refer to the result of an event (1c) or a participant in it. We will group these together as "individual-referring" or "individual" nouns.

(1) a.　　The examination of the patients took a long time　　　(Complex)
　　 b.　　The examination took a long time　　　　　　　　(Simple)
　　 c.　　The examination was on the table　　　　　　　　 (Result)

　　Only complex event nominals behave like verbs in licensing event-related PPs, like *in an hour, for an hour*, see Grimshaw (1990), Zucchi (1993). In this they behave like verbs. As a consequence of their event structure, they have argument structure, again like verbs, with the result that they have arguments which are obligatorily present. They also disallow indefinite determiners (**an examination of the patients*). The examples in (2) are further instances of complex event nominals, this time formed with *–ment*. We illustrate properties of complex event nominals through nouns formed with *–ment* and *–(a)tion* throughout the paper.

(2) a.　　The frequent payment of your bills keeps your credit rating good.
　　 b.　　We demanded the replacement of the broken cups in no more than three days.

Like *examination*, the nouns in (2) can be individual nominals in addition to their complex event readings; for example *a payment*, *the replacements* are grammatical. Simple event nominals neither license event-related PPs, nor have argument structure. Like complex event nominals, simple event nominals denote events, but syntactically they are similar to individual nominals. Two examples are *event* itself, and *race* in (3b):

(3) a.　　The event was well organized.
　　 b.　　The race lasted one hour.

　　Result nominals and participant nominals likewise fail to license event-related PPs, lack argument structure, and have no event interpretation at all. Apart from the fact that they are derived from verbs, individual nouns have the same syntax as non-verb-related nouns: *dog*, *house*, *event*, *trip*.
　　Nominals derived from verbs with no (overt) affix behave as simple event nouns and/or individual nouns.[2] This is true also for irregulars like *gift*.

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[2] Some ∅-derived nominals do seem to license arguments (cf. i). The systematicity of these examples remains to be examined, see Newmeyer (to appear) for discussion.

(4) a. *The constant offer of credit cards to students………….
     b. *(The) frequent report of looting …………………

The special behaviour of bare nominals is analyzed in Smith (1972). She discusses verbs of English which engage in the causative/inchoative alternation, and nominalize without (overt) affixation. Smith points out that these verbs never nominalize as "transitive" nouns, but only as nouns with a possessor alone (see also Chomsky 1970). Examples include *change*, *end* and *stop*, which form nominals, but not transitive ones. The generalization is visible in these contrasts: *the climate's change/*global warming's change of the climate*; *the race's end/*the judge's end of the race*; *The train's unscheduled stop/*The guard's unscheduled stop of the train*. In fact, using the criteria of Grimshaw (1990), it is possible to show that these "intransitive" nominals are not complex event nominals. Their limited interpretations support the claim that zero-derived nominalization never preserves event structure. Smith also shows that causative verbs which nominalize with certain affixes show contrasting behaviour: they do nominalize transitively. We return to this point in Section 6.1.

If we collapse all the nominals discussed so far, and examine them all together, it appears that nouns can show just about any set of properties. Grimshaw's (1990) conclusion was different: that there is a rigid distinction between nouns which have argument structure and those that do not, which is obscured by the rather systematic ambiguities illustrated above.

Table 1 compares result nominals with complex event nominals in these and other respects.

Table 1: Some differences between result and complex event nominals

	Result-Nominals	Complex Event-Nominals
a.	Non-θ-assigner, No obligatory arguments	θ-assigners, Obligatory arguments
b.	No event reading	Event reading
c.	No agent-oriented modifiers	Agent-oriented modifiers
d.	Subjects are possessives	Subjects are arguments
e.	*by* phrases are non-arguments	*by* phrases are arguments
f.	No implicit argument control	Implicit argument control
g.	No aspectual modifiers	Aspectual modifiers
h.	Modifiers like *frequent*, *constant* only with plural	Modifiers like *frequent*, *constant* appear with singular
i.	May be plural	Must be singular

(i) a. My constant change of mentors
     b. The frequent release of the prisoners by the governor (David Embick (p.c.)

2.   The generalizations to be explained

Following up on the empirical observations of Section 1, we highlight a core set of generalizations which must be explained.

1)   Only nouns which are related to corresponding verbs have argument structure. From this we conclude that being associated with an event structure/argument structure is not a property of nouns *per se*. The noun *event*, illustrated above, has no event/argument structure, even though, crudely speaking, it has the right kind of meaning. Similarly, the noun *trip*: trips have beginnings and ends, for example. Yet it is impossible to say **my trip for three weeks* or **my trip in three weeks* (on the relevant reading) or **my frequent trip to the UK*.[3] This leads us to conclude that the verb-like properties of complex event nouns are attributable to the affixes which derive nouns from verbs, or to the verbal bases themselves, or both. (Although the verb *trip* exists it has specialized meanings which are semantically distant from the noun.)

2)   As noted above, nouns which are identical in form to verbs do not generally behave like complex event nominals, i.e. they are rigidly different from verbs (recall *offer*, *report* above). Why? A simple-minded view suggests that they should be most like verbs.

3)   *–ing* nominals are always complex event nominals: Lebeaux (1986) pointed out that they can take obligatory arguments, and Grimshaw (1990) and Harley & Noyer (1998) offer further evidence.[4]

4)   *–(a)tion* and *–ment* nominals are frequently ambiguous between eventive and non eventive readings. See *examination* and *replacement* above. We must conclude that nominal affixes, affixes which belong to a single syntactic category (here nouns), can yield different interpretations, e.g. *–ing* vs.   *–ation*. Also, individual affixes can show a variety of behaviours, as *–ment* and   *–(a)tion* do.

3.   Nouns and argument structure: where does responsibility lie?

The two models we are investigating attribute noun ~ argument structure association to two different aspects of representation. In the structural model the presence of argument structure follows from the presence of a VP node inside the nominal structure (or perhaps some functional projection of VP). In the event model the presence of argument structure follows from the existence of an event structure, or "tier" matching the content of the nominal structure.

The event-based model posits a representation of the event structure of a noun (or verb), which is linked to an argument structure. A complex event nominal, by definition, denotes an event with an internal aspectual structure. For

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[3] Although *my most frequent trip* is grammatical, suggesting a different interpretation for *frequent* here.
[4] Apparent counterexamples seem to be arbitrary lexicalizations: *a good living*, *hand-writing* etc. The references cited above discuss such cases.

example, the noun *replacement* has the (obviously simplified) representations in (5).

(5)   a.   *replacement*:   the individual "z" in <x replaces y with z>
              No aspect
       b.   *replacement*:   the event <x replaces y with z>
              Aspect – telic

In (5a), the noun corresponds to an argument of the verb, in (5b) it corresponds to the event encoded by the verb: the noun is telic, like the base verb.

The structure-based model represents the difference between the two noun types in terms of the presence of verbal functional layers and the height of affixation. The higher the affix is in the structure, the more verbal properties the derived noun will show. Complex event nominals are derived by high affixation. In other words, complex event nominals contain some functional projection of VP, while participant and simple event nominals lack such a projection. The main idea behind the structural model could be described as follows: it is the syntactic structure that gives rise to an event template which in turn determines the interpretation of arguments (see Borer 2001). In other words, the event interpretation arises through the presence of verbal functional layers in the nominal structure.

4.   Towards a description

Both of these theories offer the possibility of describing the facts as presented in Section 2. The questions we are interested in arise in both the structural model and the event model, and receive, surprisingly, answers of comparable status. This becomes quite clear when we ask about explanation, rather than just description. We move to this question in Section 5.

4.1   Preservation of argument structure under nominalization

We consider the generalizations in 1) – 4) above in turn.

1)   Why is it only nouns which are derived from verbs that have complex event readings/argument structure? This follows if only verbs, not nouns, can have event structure/argument structure. Under this assumption, the only way for a noun to be associated with an argument structure is for it to be derived from a verb. This assumption must apparently be made by both theories.
In the event-based model, what must be eliminated is a representation of the form shown in (6). (6) is intended to represent a noun with no internal verbal structure, with an associated argument structure in angled brackets and an aspectual structure in parentheses.

(6) [N   ]   <x,….   >   (aspect: telic/atelic/…)

In contrast, (7) must be allowed:

(7) [V   ]   <x,….   >   (aspect: telic/atelic/…)

We can hypothesize that the representation in (7) is the only one allowed for verbs: all verbs must have an event structure and an argument structure. A noun derived from a verb is represented this way, when the nominalization is event-structure-preserving:

(8) [N [V] ..]   <x,….   >   (aspect: telic/atelic/…)

It is the verb, and not the noun, that is the source of the event structure and argument structure, so the representations are consistent with the principles governing verbs versus nouns. In this way, the model predicts that only nouns derived from verbs can have argument structure.

It should be noted that the prediction is based on a stipulation (namely that nouns never have event structure or argument structure) which presumably has some more profound basis. In the structure-based theory, a virtually identical stipulation gives an identical result.

If nouns cannot have argument structure, and verbs can or must, then a noun which appears as the lexical head of an extended nominal can have no argument structure. A noun which is built up from a V which is the lexical head of a VP projection can have an argument structure, since it is contributed by the V.

The generalizations in 2), 3) and 4) all concern the effects of category-changing (from V to N): by no affixation at all, by affixation with –*ing*, and by affixation with –*(a)tion* or –*ment*.

As noted above, nouns which are identical in form to verbs do not generally behave like complex event nominals. As we also noted above, the simplest theory suggests that they should be most like verbs.

In the event based theory, the grammar stipulates which affixes "preserve the verbal property of having argument structure", which do not, and which do both, perhaps because they are unspecified for this property. The suffix –*ing* is argument-preserving, and –*(a)tion* and –*ment* are ambiguous/unspecified. Zero-derivation involves an affix which is unpronounced, and this affix is opaque to argument-transfer.[5] This is in essence what is proposed in Grimshaw (1990: 67).

The cases of nominalization delineated above are thus represented as in (9-11):

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[5] Referring to identical noun~verb pairs as "zero affixation" maximises the parallels between this and the overt affixations.

(9)   "zero" affixation:
        [N [V] Ø]   <…>   (aspect: ...)

(10)   affixation with *–ing*:
        [N [V] –ing]   <x,….>   (aspect: telic/atelic/…)

(11)   affixation with *–(a)tion*; *–ment*:
    a.   [N [V] –(a)tion]   <…>   (aspect: ...)

    b.   [N [V] –(a)tion]   <x,….>   (telic/atelic/…)

In a particular instantiation of the structural model it has been argued that exponents such as *–ing*, *–ation*/*–ment* and zero morphology have rather distinct specifications for insertions. Specifically, certain exponents, which are nominal-category-determining heads can attach both to roots ("low/root attachment") and/or to some further layers of structure, "high/outer cycle attachment", in accordance with a low vs. high attachment parameter. (See Marantz 2001, Alexiadou 2001, and Embick 2003 crucially echoing Abney's 1987 intuition.) Some can attach only high or only low. In other words, all these exponents express nominal categories, but they differ with respect to the height of affixation.

    The zero affix discussed here, then, attaches only to roots:

(12)   [D [n Ø [√

As a result, nominals derived from verbs by zero-affixation have no argument structure, since they contain no verbal projections.

    For gerundive *–ing*, the structural model posits a VoiceP, a vP and an AspP, as projections above the root and below the DP, as in (13a-b). Here *-ing* is the head of AspP in the case of verbal gerunds, and realises n in the case of nominal gerunds, see Alexiadou & al. (2008), cf. Borer (2005):

(13)   a.   [D [AspP ing   [VoiceP [vP [√
        b.   [D [n   ing   [VoiceP [vP [√

Since the root here is embedded within verbal functional projections, it preserves its argument structure.

    Finally, in both accounts, nominal exponents such as *–(a)tion* can be doubly specified, or underspecified. In the structural model, as proposed in Alexiadou (2001), this allows it to attach directly to stems/roots, giving rise to full nominals. It may also attach to something larger, a VP (+functional projections). When *–(a)tion* attaches to the root directly it gives rise to a nominal lacking argument

structure.[6] When it attaches high, the result is a nominal that has some verbal properties; in a sense, the root first becomes a verb and then a noun.[7]

(14)   [D [n –ation [vP [√

In other words, *–(a)tion* can appear in the structure in (14) as well as in the structure in (12), while *–ing* can be 'specified' as entering only in the structure in (13). Bare root nominals can appear only in the structure in (12). So particular exponents of the nominal category, e.g. *–(a)tion*, *–ing* and the "zero" morpheme appear in specific contexts (see Embick 2003). It will be obvious that underspecification, or double specification in the event model, similarly has the result that the *–(a)tion* and *–ment* suffixes can behave either like the null affix, or like *–ing*.

This completes our summary of the alternative models of nominalization. Of course, various combinations of these two approaches could be envisaged, but as far as we can tell, the assessment of the proposals we give below would extend equally to such mixed solutions.

4.2   The behaviour of adjectives and adverbs in nominalizations

A further consideration which potentially separates the event and structural models is the discovery that complex event nominals can contain some adverbs. This leads to the hypothesis that complex event nominals have at least VP inside them, and possibly more verbal structure such as AspP (see Fu et al 2001, Hazout 1991, Alexiadou 2001).

The above authors note that certain adverbs are possible within complex nominals (see (15) and (16) below).[8]

(15)   a.   The arrival of the trains **promptly** at the station ...
         b.   His careful destruction of the documents **immediately** ...

(16)   *His explanation of the problem **fortunately** to the tenants ...

The logic of the argument is as follows: It is generally accepted that adverbs modify verbal elements. But adverbs are distinguished (very roughly) into VP modifiers, i.e. adverbs which modify only verbs/verb phrases (VP), e.g. *The trains arrived promptly at the station* and sentence (S) modifiers, i.e. adverbs that

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[6] This analysis has been refined in Alexiadou (to appear) and Harley (to appear).

[7] Note here that VoiceP is missing in *-ation* nominals. In agreement with Kratzer (1994), external arguments are never assigned by the lexical entry, but by **Voice**. *-Ation* nominals lack Voice and therefore they never have an external argument.

[8] Siloni (1997) argues that apparent adverbials in the comparable Hebrew structures are really adverbial PPs, adding another dimension to the interpretation of the adverb facts. See Borer (1993) for counterarguments.

modify propositions, e.g. *Fortunately he explained the problem to the tenants*. Traditionally this distinction is resolved in terms of attachment of the modifier, VP-adverbs attach to VPs, S-adverbs attach to sentences (TPs). The structural hypothesis interprets the generalizations concerning the types of adverbs that can be found within nominals as telling us something about the types of verbal projections we can find, especially in view of recent typologies that recognize a relationship between adverb types and inflectional material (see especially Cinque's 1999 evidence for this richer picture of adverbs and also Alexiadou 1997). In this view, the admissibility of certain adverbs in complex event nominals is not a fact that simply has to do with some kind of semantic compatibility (*a priori* the semantics of a process nominal should not be different from the semantics of a verb). Rather, it is a syntactic fact that has to do with the principles that determine which elements can be attached at which positions in the tree structure. This does not mean that the admissibility of adverbs has nothing to do with the event interpretation associated with process nominals. But the interpretation of such nominals as denoting events is not sufficient as an explanation to the restrictions on the distribution of adverbs.

In contrast, the event-based hypothesis attributes the well-formedness of adverbial modification directly to the event structure of complex event nominals and asserts that the semantics of complex event nominals *does* distinguish them in the relevant way from verbs (contra the position outlined in the previous paragraph). Since these nominals denote events and not propositions, it is expected that only event-related, and not proposition-related adverbials will be able to appear, explaining (15) and (16) above.

In sum, adverbs modify semantic units, and they also appear in particular configurational positions. Assuming that the semantic units and the configurations match, the modified semantic units correspond to structural layers in the syntax. So which licenses the adverbs? See Haider (2001), and Ernst (1998) for further discussion.

5.   Assessing the results

The success of these theories, or views, of nominalization can be judged by comparison of what they stipulate, and what they derive from their premises. It is striking, then, that *both stipulate the same information, albeit in different form*.

5.1   The stipulations

The "zero" morpheme is never transparent/always attaches to the root.

This is an accident in both models. The "zero" affix could always be transparent to argument structure (its nominal forms thus always having an event structure and argument structure). In the VP model, it could be attached only at the higher level, and its nominal forms would then always have argument structure.

Moreover, the "zero" affix could instead be unspecified for transparency/level of attachment, and thus behave like *–ment* and *–(a)tion*, in attaching to both low and high levels of structure, or, to put it the other way, be like *–ment* and *–(a)tion* in showing indifference to the complex event/simple event interpretations.

From a broader perspective, it is striking that nouns which are identical in form to verbs do NOT behave like complex event nominals, since as pointed out in Section 2 the simplest theory actually suggests that they should be most like verbs. Both the models investigated here lack insight into this problem (cf. Borer 2005). In the event structure theory these nouns look the most like verbs, and verbs have argument structure. Likewise, in the syntactic account, we would expect zero nominal morphology to always attach high, since zero nouns most resemble verbs.[9]

The *–ing* affix is always transparent/always attaches high up

Again, the *–ing* affix is merely stipulated to be only transparent/high attached, when in principle it could be non-transparent/attached to the root, or unspecified. Neither theory offers an explanation for the fact that this affix has to be unspecified and the others may not be. One might want to speculate here that this is related to the existence of the verbal suffix *–ing*, see Alexiadou & al. 2008, Borer (2005).

The *–(a)tion/–ment* affixes are unspecified

Why is it these affixes that are unspecified? Why is it only these affixes that are underspecified? Is it accidental that both of them are underspecified? Neither theory answers these questions.[10]

Presumably there is more to the nominalization patterns than these theories have been able to explicate. What is a surprise is the fact that what we might call the articulation points are exactly the same. By this we mean that comparable stipulations are necessary at comparable points in the structure of the theories. The principal difficulties arise from the non-uniformity of deverbal nominalization patterns: different affixation types exhibit different behaviour. The successes and failures of the two models occur on exactly the same questions. What one describes, the other describes. What one fails to explain, the other fails to explain, and for fundamentally the same reasons.

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[9] Borer (to appear) assumes that zero morphology does not exist. In her analysis zero derived nominals are simply lexical items inserted in nominal structure. Such nominals were never verbs, and hence lack argument structure properties.

[10] This is one of the reasons why other alternatives are pursued in Alexiadou (to appear) and Harley (to appear). Both these papers argue that the difference between argument structure and non-argument structure nominals does not depend on the presence of a verbal source. These approaches attempt to derive the difference related to AS from the role of higher projections such as Number.

6.   Further hypotheses

6.1   Partial nominalization and "zero" affixation

Grimshaw (2004) addresses one core puzzle in these nominalization generalizations; the surprisingly widespread (apparent) ambiguity shown by the system. The same stem enters into both complex event nominals and others (e.g. *examine*). The same affix enters into both complex event nominals and others (e.g. *–(a)tion, –ment*).

In advance of empirical investigation, we would assume that either it is a property of the stem that determines what derivation processes it undergoes, or it is a property of the affix. If the stem is decisive, the stem should be consistent, entering into only one kind of nominalization. If the affix is decisive, the affix should be consistent, entering into only one kind of nominalization. The fact that this is not the way the language works is only covered up, and not explicated, by the underspecification or double specification of *–(a)tion* and *–ment*.

Grimshaw (2004) proposes that the apparent ambiguity or under-specification effects are due to *two-step nominalization*. Nominals of the "individual" type are derived from verbs in two steps: complex event nominalization with suffixation by *–(a)tion* or *–ment*, followed by simple nominalization with no (overt) affixation. "Zero" nominalization is thus involved in the conversion of a complex event nominal to a nominal with no argument structure, and nominalization in which event structure properties of the base are eliminated are consistently analyzed. It is "zero" nominalization that is responsible for both cases of event structure loss: for the deverbal nouns with no affix at all, and for the deverbal nouns which are affixally constructed.

In this analysis, complex event nominalization by overt suffixation, results in the creation of a partial nominalization, one which retains event structure and hence some verb-like properties. Conversion, or the addition of a null suffix, creates a full nominalization, with no verb-like properties. The suffix *is not ambiguous or underspecified*, so the analysis of Section 4.2 is now significantly revised. The suffix always behaves in the same way, as a complex event nominalizer. Moreover the stem always behaves in the same way – it undergoes complex event nominalization. In this way, the puzzle sketched above, that neither the stems nor the affixes seem to show consistent behaviour, is resolved. The structural analysis as presented in 6.2 does not share this property, since it posits underspecified suffixes.

Complex event nominalization with the *–ation, –ment* suffixes now has exactly the same analysis as *–ing* nominalization, as (17) shows. (The only difference is that *–ing* nominals derived in step (17) do not undergo the general zero affixation in (18), a fact for which we can offer no explanation.) This analysis seems to be incompatible with the structural hypothesis, since an affix introduced at a higher level of structure would be acting as part of a root; necessary for it to undergo zero nominalization. This analysis seems to be

incompatible with the structural hypothesis, since in this model there is no general zero affixation part.

The affixation-based nominals are thus now represented as in (17-18), contrasting with the analysis in (10) and (11) above.

(17)   affixation with –*ing*, –*(a)tion*, –*ment*
      [N [V] –ing]   <x,….   >   (aspect: telic/atelic/…)
      [N [V] –(a)tion)]   <x,….   >   (aspect: telic/atelic/…)

(18)   "zero" affixation of the –*(a)tion* noun:
      [N [N [V] –(a)tion)] Ø]   <…….   >   (aspect: …….)

As (18) shows, the zero affixation step for the partially derived –*ation*, –*ment* nominals converts a noun to another noun, and not a verb to a noun as in the previously analyzed cases of zero nominalization. By hypothesis, the null affix derivation results in loss of (event structure and) argument structure in both cases. The presence of argument structure is forced by the presence of a V in these derived nominals, except where "zero" affixation has prevented preservation of the verb's event related properties. This is a generalization which does not hold if –*(a)tion* and –*ment* nominals have identical verb structure, regardless of their interpretations, as they do in the representations in (11a, b) in Section 4.2.

As we reported in Section 1, Smith (1972) argued that the ability to derive "transitive" causative nominalizations from intransitive causative verbs is limited to affixes drawn from the Latin vocabulary and is not seen in the Anglo-Saxon vocabulary of English. Thus *alteration* contrasts with *change*, *termination* with *stop*, and *conclusion* with *end*. Grimshaw (2004) attributes this to the fact that nouns which are zero-derived from verbs cannot be complex event nominals (and hence cannot express a "subject" argument and an "object" argument). Since Germanic verbs nominalize only through the zero affixation, they never preserve their event structure and their argument structure.

With respect to Romance verbs, Smith's generalization can be interpreted in these terms: nouns which are derived from Romance verbs via Romance morphology have event structure and argument structure. Romance verbs undergo only the overt affixation of (17), if we are permitted to simplify a little.[11] Hence Romance verbs nominalize with argument structure preservation (and can undergo subsequent zero derivation, as we have just seen). If this is correct, the vocabulary of English bifurcates into Romance stems and affixes, case (11), and

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[11] Is it the vocabulary affiliation of the stem which governs its nominalization pattern, or it is the affiliation of the affix (as Smith suggests)? To illustrate the issue, *report* is a stem of Latin origin, but does not form a complex event nominal. (In contrast, *release* seems to, as observed in fn. 2.) On the other hand, Latinate verbs (where the affixal status of nominalization is not at stake) do not undergo dative shift (Grimshaw 2005), suggesting that affiliation of the stem determines the grammar of the words. We must leave these matters unresolved.

Germanic stems (and "zero" affixes), case (9), with only Romance forms showing argument structure preservation.

6.2   The Romance vs. Germanic vocabulary and the structural analysis

The structural theory, then, must have some way to accommodate the vocabulary-type distinction of English. We believe that this is the case. Following Embick (2003), the structural analysis can re-phrase the vocabulary partition just observed on the basis of the manner in which vocabulary insertion proceeds. Specifically, it can be argued that vocabulary insertion is divided into distinct *cycles* of insertion, with potentially different conditions on insertion applying in Root-attached vs. non-Root-attached structural domains.

Recall the three structures we proposed in section 3 and repeated in (19):

(19) a.   [D   [AspP ing [VoiceP   [vP [√
      b.   [D   [n ing   [VoiceP   [vP [√
      c.   [D   [n ation   [vP [√
      d.   [D   [n Ø   [√

As mentioned, n can have three different exponents: e.g. *–ing*, *–ation* and zero. Vocabulary insertion is divided into distinct *cycles*, a Root Cycle (19d) and an Outer cycle (19a-c). What this means is simply that a distinction is made between (1) functional heads attaching directly to the Root, and (2) functional heads attaching higher, i.e. outside of other functional heads. For the purposes of insertion, we label zero affixation a "stand-out" nominal allomorph, which is possible only in the root cycle.

(20)   Allomorphy generalization: a stand-out allomorphy is possible only in the root cycle.

On this view, zero nominals are special because the nominal head n is attached directly to the Root. The nominal allomorphy patterns discussed in this paper result thus from considerations of locality. The allomorphy generalization above leads to the result that ∅-insertion is root-related, as in (19d). Since the particular exponents are sensitive to root involvement, we expect that the higher the affixation the less restrictions are observed. This means that *–ing* can basically attach to anything, explaining the productivity of gerunds, as opposed to zero nominals. Finally, *–(a)tion* can occur in both cycles, being underspecified. The hypothesis that *–(a)tion* is underspecified distinguishes this structural account from the partial nominalization proposal in 6.1. The partial nominalization hypothesis denies ambiguity or underspecification for *–(a)tion* and *–ment*.

The remarks on the Germanic vs. Romance vocabulary are a step towards the specification of the roots that are on a list in the Root Cycle for (∅-insertion) but not in the Outer Cycle. This means that the lists consulted for vocabulary

insertion into Root-attached heads differ from the lists consulted for insertion in non-Root-attached heads. This is illustrated in (21):

(21) a.   Spell-out of n: Root Cycle
        n   ↔   -∅/__   {√STOP, √END, √JUMP...}
        n   ↔   *-ation*/__   {√DESTROY, √CONCLUDE...}
    b.   Spell-out of n: Outer Cycle
        n   ↔   *-ation*/__   {√DESTROY, √CONCLUDE...}
        n   ↔   *-ing*

Recall that *–ation* is underspecified, and hence it can occur in both cycles, i.e. both the inner and the outer cycle. When it does occur in the root cycle, it crucially makes reference to a different set of items than the ∅ affix. Ideally, the lists should be different for the two cycles. But in this case, Roots take the same allomorph in both the Root and Outer Cycles, as one might expect.

What the above suggests is that there is a sensitivity of the functional head to the properties of the root. That this is the case in (21a) is uncontroversial. However, it is not clear how to derive this in the case of (21b), where the functional head n attaches to other functional layers. See Embick (2003) for some thoughts on this issue.

7.   What does the above explain?

We have laid out a set of generalizations holding of English deverbal nominals. We have investigated how each generalization may be described or derived under two different views of deverbal nominals with a complex event interpretation: that they have internal verbal syntax and that they denote events.

- All complex event nominals (i.e. those with argument structure) are deverbal, because nouns themselves never have argument structure.
- Adverbs are licensed inside complex event nominals because they have verbal functional projections, or because they denote events.
- Bare nominalizations are never argument taking because zero derivation never preserves event structure, or because the zero derivation suffix is always generated too low. It is Germanic verb stems that fall into this category.
- Overtly suffixed nominalizations (Romance stems and suffixes only) show complex event nominal properties, because their affixation preserves event structure, or because their affixes are generated high in the verbal functional projection.

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