Events and Aspectual Structure in Derivational Morphology[1]

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Events have been represented as part of the lexicon (Grimshaw 1990; Pustejovsky 1991), as part of argument structure (Davidson 1967; Higginbotham 1985; Kratzer 1994), in aspectual projections (Tenny 1994; Borer 1994; Travis 1991, 1994) and as a property of Feature Checking (van Hout 1996). We argue that the Feature Checking account defined on Event related projections captures morphological variation.

The power of the proposal is reflected in its application to diverse domains. A great deal of modern argumentation suggests that morphology can be integrated into syntax. Therefore, we predict that Events in morphological representations should be captured within the same principles that we find in syntax. We argue that Events project argument positions and license adjuncts within words derived by productive morphology too.

1   Introduction

This paper will extend the theory of Events in syntax to the realm of morphology. It aims to account for the crucial contrast in (1).

() 　　. 　　The lawn-mower just walked in.
　　　　　⇒　no mowing event is entailed
　　　　　　　-er compound has an Instrument or Agent reading
　　. 　　The mower of the lawn just walked in.
　　　　　⇒　a mowing event is entailed
　　　　　　　-er nominal has only an Agent reading

Subtle contrasts invoke abstract differences. Our argument has three ingredients. (i) Derived nominals contain a VP plus TP, AspP and Voice-EventP projections. (ii) Aspectual features, like [+telic], are checked by object movement. (iii) Therefore, object movement must occur within derivational morphology and derivational affixes must project the TP, AspP, Voice-EventP plus VP structure which demands movement. In contrast to nominalization structures, compounds like *lawn-mower* involve an incorporation operation that prevents object movement and therefore prevents checking Event Features.

To sustain this argument we must justify the VP-within-Nominalizations theory of morphology (cf. Fu, Roeper and Borer 1996), introduce a theory of Event Feature Checking (cf. van Hout 1996) and explain how non-eventive incorporation functions (cf. Keyser and Roeper 1992). We

argue, in effect, that the differences between syntax and morphology are very superficial: not only do the same principles apply in both domains but derivations in morphology are intertwined with syntactic rules.

We argue that various Event properties are located in different nodes inside the nominalization. TP closes off the event variable, giving the event entailment. AspP is the locus for telicity checking and creates a syntactic position for the object in its Specifier position. Voice-EventP contains voice features and creates a syntactic position for the Agent of the event in its Specifier position. We take our Voice-Event phrase to be a version of Kratzer's (1994) proposal for a Voice phrase, or Chomsky's (1995) proposal that a small v introduces transitivity. However, we wish to point out that, unlike Kratzer, we include the Voice-Event node in nominalizations, and, unlike Chomsky, we believe that the small v has a licensing function for the traditional voice differentiations, that is, active, passive and middle. We also realize that a full mapping between voice properties and argument distribution is what a full theory must account for. We are providing just one section of such an analysis here.

What must the larger notion of Event entail? We take the virtue of this concept, over a simple list of thematic roles, to be precisely that it articulates entailment relations in a richer semantics. It is well-known that the presence of an instrument indicates the presence of an Agent, though not the reverse, and it is also the case that a rationale clause, which is traditionally an adjunct, must be licensed by the presence of an Agent.[2] Therefore, we see that all thematic roles are not equal and Agent has a special status. The special status of Agents has sometimes been represented by a Thematic Hierarchy. In the small v system, it is represented as the specifier of a node that is associated with events, i.e., has Event Formal Features. As the Specifier of what we call Voice-Event node, it will be in a structural relation to objects, PP adjuncts, instruments and rationale clauses. For rationale clauses, this structural position allows appropriate c-command control.

2   Events in morphology

Many deverbalizing affixes prohibit projection of the underlying verb's arguments, (2); they also block adjuncts, like manner and rationale clauses, (3).

()   .   *   an employee by Mary
        .   *   persuasive of John
        .   *   proudly of her children
        .   *   a push-0 of John

()   .   *   an advisee to finish his paper

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[2] Only when an Agent is present is an instrument possible (Deng Xiaoping 1991). For example, the verb *please* can take either an agentive as in (ia) or a non-agentive subject as in (ib); this determines the possibility of modification by an instrument.
> (i)   a.   The performer pleased the crowd with a somersault.
>   b.   *The circus pleased the crowd with a somersault.

The same holds for rationale clauses. The implicit Agent in a passive such as (iia) makes the difference as compared with an unaccusative as in (iib) (Roeper 1987).
> (ii)   a.   The boat was sunk to collect the insurance.
>   b.   *The boat sank to collect the insurance.

. * a trainee with great effort
. * a kick-0 quickly.

We argue that other affixes carry the underlying verb's event structure, thereby projecting argument positions and licensing adjuncts, (4).

() . the consumption of drugs by college students to go asleep
. the discovery of a new product to enrich our society
. the mowing of the lawn with an old-fashioned mower in an hour
. the destruction of the city quickly

How and where can we capture the notion of Event inside nominalizations? We are led once again to the recurrent idea (Lees 1960; Newmeyer 1972; Borer 1991; Fu, Borer and Roeper 1996, see below) that VP and NP share some syntactic structure. The most parsimonious and straightforward claim is simply that nominalizations contain a fully projected VP. We propose that suffixes *-tion*, *-ing* and *-y* dominate a VP plus Voice-EventP, AspP and TP nodes. These nodes project argument positions, yield event entailments and license manner, purpose, instrumental and temporal modifiers. The former kind of suffixes, *-ee*, *-ive*, *-ly* and *-0*, do not contain a fullfledged VP and therefore do not provide argument positions, yield event entailments or license event modifiers. Their analysis, we argue below, retains some verbal projection at a lower level in the tree. We shall argue that an updated version of the Abstract Clitic Hypothesis of Keyser and Roeper (1992) captures non-eventive syntactic projections within morphology.

If structure, not the content of the morphological item, governs Event properties, then we predict that the same affix can differ in its entailments dependent upon its structural context. We find precisely this contrast in *-er* nominals. (These facts are introduced in Roeper (1987) and discussed in Rappaport Hovav and Levin (1992)). Compare *-er* in nominalizations and compounds:

() . the mower of the lawn a'. the lawn-mower
. the trainer of dogs b'. the dog-trainer
. the saver of lifes c'. the life-saver

The nominalizations on the left entail an event: a mower of the lawn must have mowed a lawn; a trainer of dogs is someone who has trained dogs; a saver of lives has saved at least one life. On the other hand, the compounds on the right (both on their agent and their instrument readings) do not entail an event: no lawn need to have been mowed by a lawn-mower; a dog-trainer is someone who may not have trained any dogs, but simply finished dog-trainer school; a life-saver may not have saved any lifes yet, though he is paid to hold the job.

We provide here an overview of our analysis which we will repeat in greater detail in sections 3 through 6. Once again, drawing a parallel with the projection of events in sentences, we argue that nominalizations, but not compounds, involve a VP node plus several functional nodes and thereby have the proper structural environment to yield event entailments. Event entailments are given by existential closure of the verb's Davidsonian eventuality variable in TP (Kratzer 1994). In our account, the notion of closure is linked to a real syntactic operation of Event Feature Checking in TP when the verb moves up to T. *-Er* in nominalizations with a real object position (the left-hand ones in (5)) is

like *-tion*, *-ing* and *-y*, selecting for a full fledged VP. These structures likewise entail an event.

Compound *-er* nominals (the ones on the right in (5)) are generated without a functional layer above the VP, but not without all verbal structure. They are derived by incorporation at the lowest V plus complement level, as we shall detail in section 5. The compound involves incorporation of the object and yields no event entailment. What operations distinguish the compound from the nominalization? We have suggested that the nominalization involves Event Feature Checking. The operations of Feature Checking and Incorporation are incompatible, because, once incorporated, an object can no longer raise up to the Specifier position of Asp in order to check off a telicity Feature (see section 4 for details). Therefore, we argue that both syntactic structure (Specifier-Head-Complement) and syntactic operations (Feature-checking versus Incorporation) provide a motivated analysis of the semantic contrast between nominalizations and compounds. It follows then that there is no event entailment, since compounds do not contain the proper structure for existential closure of the eventuality variable. There remain, in addition, the syntactic restrictions associated with the lowest projections. This structure must be rich enough to allow a constrained form of head-incorporation.

Note that the generalization is upheld beyond *-er*: where an object is projected as a full argument, an event is entailed. The entailment may seem like an inevitable inference from meaning: how could one destroy a city without an event? Our argument, however, is that this entailment is linked to structure. Where the words remain the same, but the structure is different, no event entailment arises; compare (6a) and (6b).

()   .   Alien-invasion troubled psychics for a thousand years.
          .   Invasion of aliens troubled psychics for a thousand years.

(6a) implies that the idea of the event of an alien-invasion was troublesome for a thousand years, even if no alien ever came to earth. (6b) implies precisely that the occurrence of such invasion events was causing the trouble.

After recalling some arguments in favor of a VP inside nominalizations (section 3), we will first analyze *-tion* and *-ing* nominals with some of their Event properties (section 4) and then turn to *-er* nominals (section 5). We finish with a discussion of the licensing of Agents (section 6) and some conclusions (section 7).

3   A VP within nominalizations

We assume Hale and Keyser's (1992, 1993) basic VP structures for English with Larsonian (1988) VP-shells and, furthermore, Keyser and Roeper's (1992) basic structure for English verbs with an Abstract Clitic position to the right of the verb for bare categories of any categorial kind including affixes such as *re-*, idiomatic bare noun objects as in *lose face*, verb particles as in *sell out* and resultative adjectives as in *shake loose*.

The essence of Keyser and Roeper is that particles, datives, bare nouns, and bare adjectives are all mutually exclusive, as the pattern in (7) reveals.

()   .   play dumb   e.   *play me dumb

.	play chess	f.	*play dumb up
.	play up the game	g.	*play dumb chess
.	play me a game	h.	*play me up the game

Following Ferguson (in press), we equate Keyser and Roeper's Abstract Clitic position to the right of V with Hale and Keyser's Complement position of V (its sister to the right). Hale and Keyser take the Specifier of the lexical verb to be the canonical object position in this configuration, while the subject is base-generated outside of the VP. Therefore, we have the following strucure.

()   VP

        Spec V'
        object
              V   Compl
                       clitic (= particle, dative, bare noun, bare adjective)
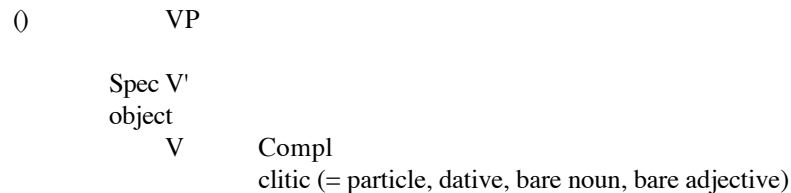
If a bare object is generated in the Clitic position, and then raises to the DP Specifier position, it will block the co-occurence of a dative, particle, bare noun or bare adjective, since these would all compete for starting out in the same Clitic position.[3]

As stated above, we basically follow Kratzer's (1994) and Chomsky's (1995) proposals on the introduction of the subject and position the subject in the Specifier posi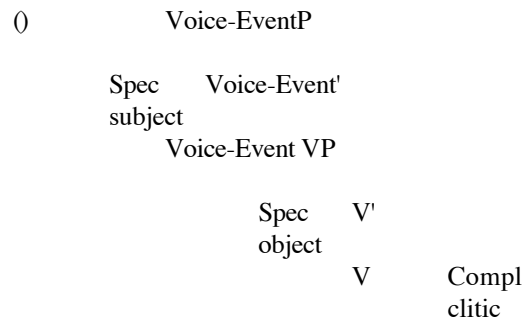tion of a Voice-Event node on top of VP, where the Voice-Event head is a light verb in Hale and Keyser's sense and V raises up to it. A basic verb phrase then looks like (9).

()   Voice-EventP

        Spec   Voice-Event'
        subject
              Voice-Event VP

                       Spec   V'
                       object
                              V   Compl
                                       clitic

We furthermore claim that nominalizations contain a fully projected VP, containing not only the lower and the upper VPs, but also several functional projections: AspP and TP (see further section 4). AspP is needed to deal with the telicity of the entailed event (van Hout 1994, 1996; Borer 1994; Travis 1994), while TP is needed for closing off the eventuality variable (Kratzer 1994).

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[3] Given the assumption that there is only one Clitic position, one must add an explanation for why prefixes can iterate, e.g., *re-overread*. Keyser and Roeper (1997) link this to the deletability of adjunct traces. That is: *re-over-read* can occur because *re-* and *over-* are like adjunct modifiers, not like arguments of the verb, so their traces can be deleted and iterability becomes possible.

What is the evidence for a VP beneath a nominalizing affix? Although historically judgements have gone in both directions, Fu, Roeper and Borer (1996, henceforth FR&B) have assembled evidence that the sharpest judgement line lies between those nominalizations that contain a hidden verb phrase and those which do not. FR&B advance a number of diagnostics which discriminate verb phrase-based nominalizations from others. For instance, consider the adverb contrast in (10).

()   .   ?   John's explanation of the problem immediately (to the tenants)
          .   *   John's version of the problem immediately
          .   John's immediate version of the problem

While *explanation* FR&B argue has an underlying VP, *version* does not and therefore only the former allows an adverb. The adverbial meaning, however, is quite compatible with *version,* as (10c) reveals. Neither case allows sentential adverbs or IP adverbs, (11a) and (11c), which argues that it is specifically the VP which is present. In each case, the meaning is retrievable through adjectival modification as in (11b) and (11d).

()   .   *   the alteration of his diaries unfortunately
          .   the unfortunate alteration of his diaries.
          .   *   his version of events unfortunately
          .   his unfortunate version of events

This argument is repeatable in a number of subtle ways with other VP diagnostics, for instance, *do so*.

()   .   John's evasion of taxes and Bill's doing so too
          .   *   John's trip to Hawaii and Bill's doing so too.

FR&B argue that the verb is raised to a higher nominalizing affix. One consequence of this is that the verb also raises over a VP adjoined adverb, producing (13a), what is not allowed in the sentential syntax, (13b), where only (13c) is allowed.

()   .   the destruction so carefully of the documents
          .   *   He destroyed so carefully the documents.
          .   He so carefully destroyed the documents

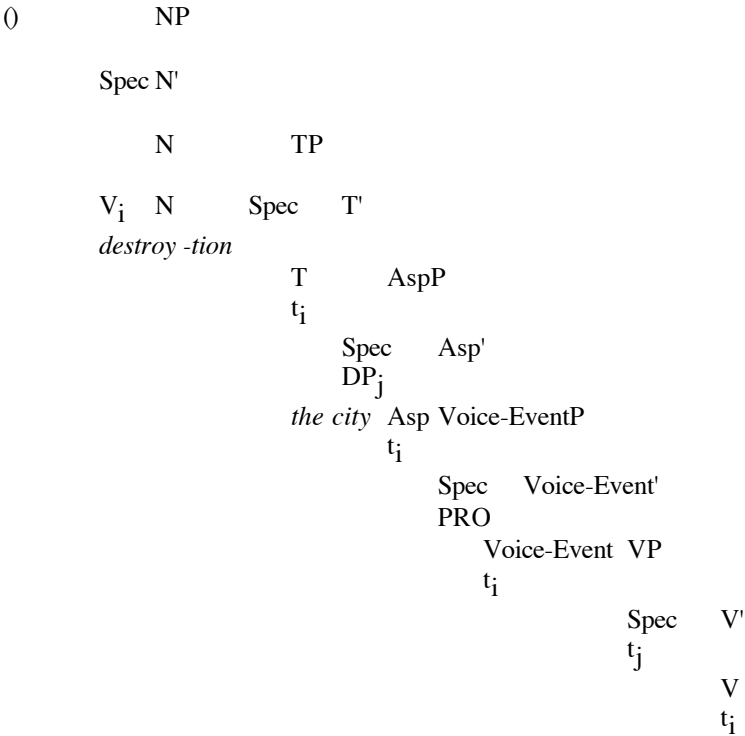This follows if the structure is essentially as in (14) and the verb raises over the adverb to get to the nominal affix.

()   NP

    -tion VP

       Adv   VP
       so carefully
           NP   V
           the documents   destroy

4   Morphosyntax of *-ing* and *-tion* nominals: a VP plus functional layers

We now provide a more detailed discussion of event denoting *-ing* and *-tion* nominalizations and their full VP structure, after which we turn to object denoting *-er* nominals in section 5.

Consider the tree in (15) for a *-tion* nominalization, *the destruction of the city*. We discuss the roles of the various projections and movements right below.

()   NP

       Spec N'

              N   TP

       V$_i$ N   Spec   T'
       destroy -tion

                      T   AspP
                      t$_i$

                         Spec   Asp'
                         DP$_j$
                      the city Asp Voice-EventP
                             t$_i$

                                 Spec   Voice-Event'
                                 PRO
                                    Voice-Event VP
                                    t$_i$

                                          Spec   V'
                                          t$_j$

                                                 V
                                                 t$_i$

Consider first Voice-EventP and the Agent argument. Taking the grammaticality of purpose clauses as an indicator of an implicit Agent (Roeper 1987), notice that all object-projecting and event-entailing suffixes also entail an Agent argument. Recall the examples, (16).

()   .   the destruction of the city to prove a point
         .   the consumption of drugs to go to sleep

If an Agent argument is introduced by the small v in its Specifier position (Chomsky 1995), or, alternatively, by a Voice head (Kratzer 1994), we must conclude (unlike Kratzer) that nominalizations contain this projection and project an Agent argument. The Agent may remain implicit or can be bound by a *by-*phrase or a phrase in the nominal's possessor position. We will simply assume that the Agent is projected as PRO in the Specifier of Voice-Event and will not elaborate further on its exact status.

Consider next AspP. It is well known that in sentences the semantic nature of the object determines the telicity of the entailed event (Verkuyl 1972). The quantized or non-quantized (= bounded or unbounded) nature of the object noun phrase is mapped onto the event structure as it is expressed by the predicate: telic or atelic, respectively (Krifka 1989). We find that the same effects

hold in nominalizations. A quantized object yields a telic event, as in (17), but a non-quantized object such as a bare plural yields an atelic event, as in (18). The familiar temporal modifiers *for an hour* and *in an hour* bring out this difference.

()   .   the destruction of the city *for hours/in an hour
          .   They destroyed the city *for hours/in an hour.

()   .   the destruction of cities for hours/*in an hour
          .   They destroyed cities for hours/*in an hour.

Van Hout (1994, 1996) has introduced a proposal on the lexicon-syntax interface based on the notion of Event Identification. This notion serves as a requirement on mapping: a verb phrase's event structure, including every subevent, must be syntactically identified. Phrases in syntactic argument positions (i.e., subject and object) identify (a part of) the event by being associated with event participants in the event structure. More specifically, the telicity of the verb phrase is syntactically instantiated by way of Feature Checking: a telic Event Feature must be checked in AgrOP. Thus associating syntactic Features with semantic content, Van Hout claims that the object in telic predicates moves to the Specifier of AgrO and the verb moves to AgrO to check telicity. In atelic predicates the object can stay inside the VP, as telicity checking does not require any movement. Hence, when the VP contains a quantized object, it must raise up to AgrOP, while a non-quantized object (a bare mass term or bare plural) does not raise. So, the objects in (17) have raised out of the VP, while those in (18) remain in the Specifier of VP.

Van Hout's argument for choosing AgrO as the locus for telicity Checking is based on the strong connection between object Case and telicity. She follows de Hoop's (1992) Case theory who proposes two different object Cases, Strong and Weak, which correlate with different semantic interpretations and syntactic positions: Strong Case is a structural Case assigned outside of VP to an object that gets a generalized quantifier reading, while weak Case is assigned within the VP and yields an object that functions semantically as a predicate modifier. While this Case distinction remains abstract in many languages (among which English), Finnish has in effect two different object Cases, accusative and partitive, which display exactly the semantic distinctions De Hoop analyzes. Van Hout connects De Hoop's view on two different object Cases to event structure by proposing that only an argument with Strong object Case can identify an event participant involved in a telic event where Strong object Case assignment involves the Specifier-Head relation in AgrO. That is, the telic Feature is checked in AgrOP.

Slightly modifying van Hout's original proposal here, we choose a more general node, AspP, for telicity Checking. Evidently, a nominalization does not have accusative Case available for its object. We have no full theory of how accusative Case marking disappears. We could simply assert that accusative Case is absorbed by *-tion*, as has been traditionally assumed for *-ed* in passives. However, no larger theory of Case-absorption has emerged so far. Therefore, since this problem goes beyond nominalizations, we will not attempt to solve it here.[4]

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[4] There are many possible moves here. We observe that the absence of structural Case arises when the verb converts into a noun, while subcategorization remains. This

TP, finally, we claim, is needed to derive the event entailment. Compare (19a,b) versus (19c). When the object is projected in a complement *of*-phrase, whether it is quantized as in (19a) or not as in (19b), one can follow up and refer to the entailed event with a pronoun, *it*. With an incorporated object as in (19c), this is not felicitous, however. In the compound case, we propose, there is no full VP plus functional layers (see section 5 for how we derive such compounds, e.g., *lawn-mower*). Remember also the different interpretations in (6).

()   .   I hated the destruction of the city. It took place last summer.
             .   I hated the destruction of cities. It took place last summer.
             .   #   I hated city-destruction. It took place last summer.

Kratzer (1994) proposes that in sentential projections, the Davidsonian eventuality variable is closed off via existential closure introduced by the tense head. We assume that there is a tense head and TP in nominalizations for the same purpose. An abstract and empty T head is semantically specified as a function from events to truth-values (in Kratzer's notation, its type is (s,t>). When applied to an event, it existentially quantifies its event argument, therby yielding the event entailment.[5]

We believe *-ing* and *-tion* nominals only differ with respect to their aspectual specification in AspP: the event entailed by an *-ing* nominalization is imperfective, whereas *-tion* entails a perfective event. The perfective-imperfective distinction has been located in AspP (e.g., Schoorlemmer 1995). We base-generate *-tion* in N where it selects a perfective TP with a zero Asp head for perfective aspect. *-Ing* on the other hand is base-generated in Asp and expresses imperfectivity (it is progressive *-ing*, not different from when it appears in the sentential domain). It raises up with the verb to an empty N node that introduces the nominalization. The tree in (20) gives this derivation for *the mowing of the lawn*.[6]

()   NP

      Spec   N'

             N   TP

    V_i+Asp_jN   SpecT'

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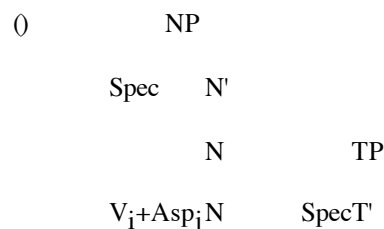
suggests that the nominal affix itself breaks the verb-object Specifier-Head relation required to obtain structural Case. This in turn suggests that movement of verb and object to Asp (or AgrO) by itself does not exhaust the requirements for Case-assignment.

[5] The abstract tense head in nominalizations may be specified as in (i), again following Kratzer's (1994) notation.
        (i) $T_{nom} =$ $P_{<s,t>}$ ze_s [P(e) & T_{nom} (e)]
Nominal tense obviously differs from sentential tense. However, we will not further develop its exact temporal anchoring properties here.

[6] The differences between *-tion* and *-ing* nominals are of interest, but not pertinent to our discussion here (which is to argue for the presence of an AspP and TP).

mow-ing -0

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            T        AspP
        t(i+j)
             Spec          Asp'
             DP(k)
    the lawn Asp Voice-EventP
                   t(i+j)
                        Spec Voice-Event'
                        PRO
                            Voice-Event  VP
                            t(i)
                                          Spec      V'
                                          t(k)
                                                    V
                                                    t(i)
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5   Morphosyntax of *-er* nominals: a bipartite analysis

We argue that *-er* nominals involve different levels of verbal subcategorization. Let us argue that it is a systematic choice: Voice-Event+VP, V-bar, or plain V. Plain V allows a free interpretation and contains many idioms: *fryer*, *sinker*, *roaster*, each of which refers to a Theme, but in a particular, drifted interpretation. *Sinker* means either a pitch in baseball or an anchor on a boat, but not a rock sinking to the bottom of a lake. V-bar takes a clitic object which then incorporates into the verb (e.g., *lawn-mower*). In the sentential system, the object incorporates at LF (see Chomsky 1995). In a nominal system, where LF operations cannot apply inside the nominal, it must incorporate overtly (see Keyser and Roeper 1997 and below). If *-er* takes Voice-Event+VP, the Voice-Event head introduces the Agent in its Specifier position which must be bound to *-er* and its object is a maximal projection in the Specifier position of VP or AspP (see below).

This array of possibilities, in effect, leaves out VP with a maximally projected object, but no Agent (basically, an intransitive frame). Why is this possiblity excluded? The reason is essentially that objects imply subjects, or rather, Themes imply Agents. This question leads back to a problem which has been addressed in many ways, most famously as Burzio's generalization, which points out that there is a connection between object Case-assignment and the presence of a subject. The problem has been addressed within Theta Theory via the argument that Affected objects imply Agents. It has been addressed within morphology via the claim that morphological rules operate on a default transitive sentence (Carlson and Roeper 1980).[7] In section 6, we address the

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[7] Carlson and Roeper (1980) discuss morphological derivations such as the following.
    (i)   a.   think about the issue => rethink the issue
             b.   John ran => John outran Bill
             c.   John lived => John outlived Bill.
             d.   Nixon outKennedied Kennedy.
These examples suggest that novel forms with prefixes assume exactly Agent-Theme relations and exclude other complements, infinitives, tensed sentences or PP's even though the underived verb can take the latter, (ii).

Object-implies-Agent licensing relation with a full discussion. We now extend a different version of this relation by saying that *-er* subcategorizes for a transitive Voice-EventP, but not an intransitive VP by itself. This then is another example of limited subcategorization linked to productive morphology.

A classic case limited subcategorization is the fact that *-th* takes only VP and not Voice-EventP as Chomsky's (1970) example shows.

()   the growth of tomatoes   = Tomatoes grew.
                                                    d Someone grew tomatoes.

On the other hand, *-ing* and *-tion*, like *-er*, require a transitive Voice-EventP. This subcategorization is a syntactic expression of what these affixes mean. Therefore, we do not find *faller because *-er* does not take the intransitive VP form. Likewise, *-th* does not take the transitive Voice-EventP form (e.g., **the stealth of the money*).

We now have a vision of productive morphology where all of four possible levels of subcategorization are realized: Voice-Event+VP (*the mower of the lawn*; *the destruction of the city*), VP (*the growth of tomatoes*), V-bar (*lawn-mower*) and V (*sinker*). Different morphological affixes select different levels of subcategorization. We find that *-er* can appear with all of them except VP which is the intransitive form.[8]

Leaving aside the drifted, bare V *-er* nominals, the crucial empirical distinction between *-er* compounds and *-er* nominalizations we want to foucs our analysis on is that nominalizations, but not compounds entail an event. Compare again (22a) and (22b).

()   a.   The lawn-mower just walked in.
        b.   The mower of the lawn just walked in.

The lawn-mower in (22a) may have just been assigned the job and never mowed a lawn in her life, while the mower of the lawn in (22b) has mowed at least one lawn.

(ii)   a.   John glamorized Bill (* to Bob).
       b.   John (*mis)-managed to go to the moon.
       c.   John (*re)-thought that Bill was late.

A transitive frame with subject and object is always possible for these Agent-Theme relations as in (iii).

(iii) John glamorized/mismanaged/rethought the affair.

These facts suggest that Agent-Theme has a special status within morphology as it also seems to in many syntactic relations.

[8] As for intransitive *-er* nominals that obligatorily and productively refer to an Agent, such as *runner*, *dancer*, *laugher* and *cryer*, we argue, as Hale and Keyser do, that these verbs are underlyingly transitive (i.e., "*do*" *a run, dance, laugh, cry*). Additional evidence for this claim is that these verbs (or their *-er* nominals) cannot combine with *re-*: **redance(r), *relaugh(er), *recry(er)*. This suggests that there is an element in the Clitic position, the bare noun object, that blocks *re-*. Extending now our own line of argumentation where an Agent *-er* is introduced in the Specifier position of Voice-EventP (see just below), we conclude that these *-er* nominals contain a Voice-EventP.
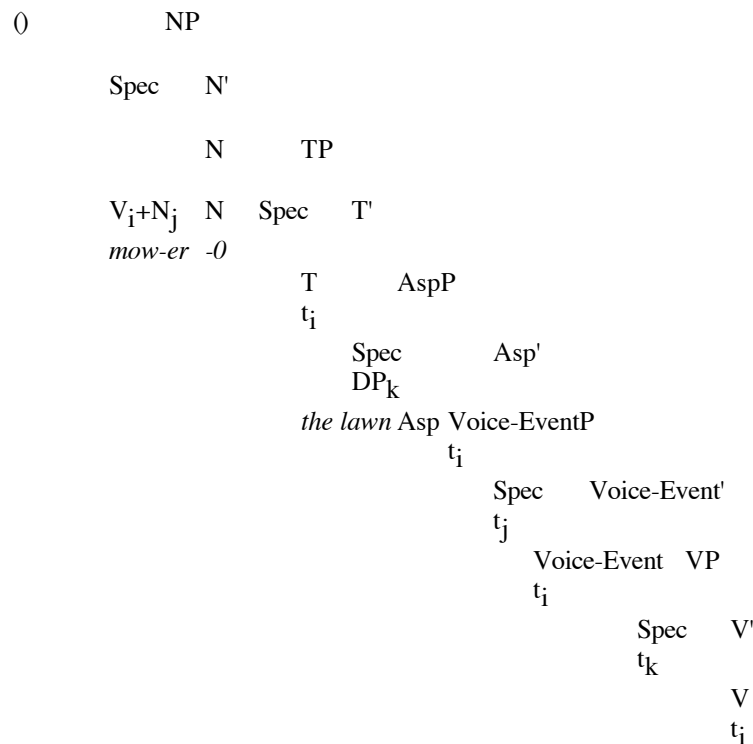
Extending our VP-inside-nominalizations analysis laid out above to *-er* nominalizations, we argue that this difference comes down to a structural difference: the nominalization contains a fully projected Voice-EventP with AspP and TP, where, as above with *-tion* and *-ing*, TP is responsible for the event entailment and AspP deals with telicity. We argue that the difference in event entailments between nominalizations and compounds reflects different ways in which the eventuality variable is saturated which is itself a consequence of different structures. In nominalizations, it gets closed off via existential closure introduced by T, yielding the event entailment. In compounds on the other hand, there is no functional structure. Hence, since there is no T to close off the variable, there is no event entailment. Without going into detail, we will assume that the eventuality variable introduced by the verb in a compound is somehow bound generically, yielding a characterizing nominal predicate.[9]

The nature of the object in *-er* nominalizations, quantized or non-quantized, determines the (a)telicity of the entailed mowing event. Compare for example (23a) and (23b). This argues for the presence of an AspP in which telicity can be checked.

()   a.   The mower of the lawn just walked in.
        b.   The mower of hay/lawns just walked in.

The tree in (24) shows the relevant projections and movements in *mower of the lawn*.

()   NP

        Spec   N'

                 N   TP

        V$_i$+N$_j$ N   Spec   T'
        mow-er *-0*

                         T   AspP
                         t$_i$

                             Spec   Asp'
                             DP$_k$

                         the lawn Asp Voice-EventP
                                         t$_i$

                                 Spec   Voice-Event'
                                 t$_j$

                                     Voice-Event   VP
                                     t$_i$

                                             Spec   V'
                                             t$_k$

                                                       V
                                                       t$_i$

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[9] Krifka et al. (1995) mention that agentive *-er* nominals typically have a characterizing meaning and use this fact to create contexts which enforce characterizing readings as in *He is a pipe smoker*.

We assume that *-er* in nominalizations is base-generated as the Agent in the Specifier of Voice-Event and moves up with the verb to an empty N head, rather than being base-generated as the nominal head. The verb raises via head-to-head movement all the way up to the N head as well and cliticizes onto it. This assumption is the most straightforward way of deriving the fact that the person denoted by the *-er* nominalization is also the Agent of the event that is entailed by it. It takes us away from positing a chain or binding relation between something in the Specifier of Voice-Event and *-er* base-generated in N which would be the alternative.

As for the object, the same analysis as for *-tion* and *-ing* nominals holds: a quantized object such as *the lawn* moves to the Specifier of Asp, while a non- quantized object such *lawns* or *hay* will stay in the Specifier of V.

Turning now to morphological contexts that do not project argument positions and do not give entail entailments, we claim that a compound nominal such as *lawn-mower* does not contain all of this structure. Hence, it does not lead to an event entailment nor to any (a)telicity distinctions.

How do we derive *lawn-mower*? Compounds only have the lower VP inside the nominal. They are head-incorporation structures with the complement base-generated as a bare noun in the Clitic position to the right of the verb. Following Keyser and Roeper (1992), an object base-generated in this position requires incorporation of the Clitic onto the verb. This happens at LF in the sentential domain. In the nominal domain, however, it needs to happen overtly, since there is no LF movement inside nominals. The tree in (25) shows the derivation.

(25)   N'   =>   N'

     N   VP   N   VP
    -er
          Spec   V' N_j+V_i N   Spec   V'
                          lawn-mow   *-er*
          V   N   V   N
       mow$_i$ *lawn*$_j$ t_i t_j
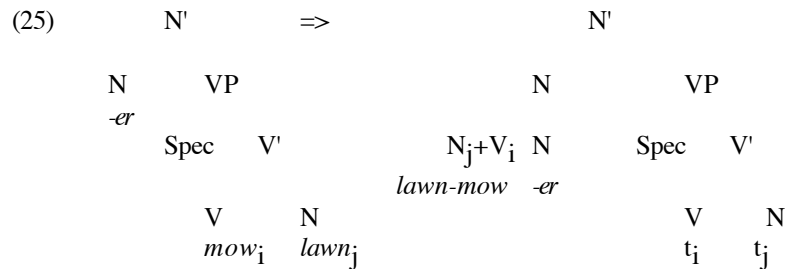
The bare complement in the Clitic position moves around the verb into its Specifier position in order to get into a proper scope configuration with the verb. It modifies the verb by restricting its meaning (e.g., restricting mowings to lawn-mowings). There, it cliticizes onto the verb, yielding a complex verbal head (lawn+mow). The complex V then moves up to and cliticizes to the left of the nominal head position in which *-er* is base-generated.[10]

Given that the object originating in the Clitic position is a bare noun, it may not end up in the Specifier position of VP, since this Specifier hosts

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[10] See Keyser and Roeper (1997) for discussion of these scope effects. They observe that there is a shift in meaning associated with the the movement of the Clitic to the left. Note for example the meaning difference in cases like (i).
    (i) a. We passed by the ad.
        b. We bypassed the ad.

maximal projections only (see Keyser and Roeper 1997). Hence, it never invokes the Object-implies-Agent property. We then have a nice explanation for the absence of an obligatory Agent reading in *lawn-mower*. The fact that the bare noun can never be in the Specifier object position is shown both by the requirement of incorporation and the absence of the nominal in (26).

(26)   * the mower of lawn

Note that examples with a mass term object like *the mower of hay* are all right, because a mass term can become a maximal projection when it moves to Specifier of V.[11]

Unlike the *-er* in nominalizations, we base-generate the *-er* in compounds in the upper N position. This will allow it to pick up either an Instrument or Agent reading, while *-er* in nominalizations is necessarily an Agent.[12] Notice that we have carefully not said that the meaning of *-er* is Agent by itself. We cannot make this assertion as a solution for *the mower of the lawn* because it would not explain why *lawn-mower* has the option of being either Agent or Instrument. In a theory where Agents are introduced external to VP, as we developed above, it is only in contexts with a Voice-EventP projection that you indeed get an Agent. Precisely in these morpho-syntactic contexts, we find implicit Agents and, moreover, we find that an *-er* nominal must be interpreted as the Agent of the event it entails.

Our analysis in which the Event potential is eliminated in compounds makes a sharp empirical prediction. The TP node projects the Asp node which

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[11] Keyser and Roeper (1997) provide evidence that the two object positions, Clitic and Specifier of V, are relatable by movement. For example, they give the following derivation for *home-rebuilding* which starts out with *home* in the Specifier and *re-* in the Clitic position of the verb *build*.
    1. *home* [*build re-*] becomes *home* [*rebuild* e] when *re-* cliticizes onto *build*;
    2. this becomes [*rebuild* e] *home* when *rebuild* raises up and around *home*;
    3. now, *home* can move into the vacated Clitic position: [*rebuild home*];
    4. finally, *home* cliticizes onto *rebuild* : *home-rebuilding*.
So, if the Clitic position is vacated, then after raising, the object can move leftward into that position (see Anagnostopoulou and Everaert (1997) for recent discussion of incorporation and references therin, all of which go in the direction of this analysis.) Keyser and Roeper use the recursive mechanism of adding something new in the opened up Clitic position to capture the different meaning implications for *over-re-invest* versus *re-over-invest*. They use the movement of the Clitic to Specifier position and subsequent cliticization onto V to capture the distinctions between *strike-out*, **out-strike* and *outcast*.
[12] Note that we need *-er* as a nominal head anyway for examples such as *New Yorker* and *Detroiter*, where there is no verb at all.

determines telicity. If it is absent, then we predict that neither telic nor atelic modifiers are possible. This is correct: we predict that neither of the compounds in (27) are possible. By contrast, though marginal, these modifiers are both possible in nominalizations, (28).

(27) a. * the lawn-mower for hours
      b. * the lawn-mower in an hour

(28) a. ? The mower of lawns for hours needs a rest.
      b. ? The mower of the lawn in an hour is very swift.

There is a contrast between (27) and (28) that is very sharp. Our analysis predicts that (28) is acceptable, but some find it unacceptable (see Randall 1982, who marks (28) as bad). However, our analysis is sustained when we take a contrastive approach: (28) is decidedly worse than (28), as predicted by the claim that there is no existentially quantified event in (28) (see also FR&B).[13]

Di Sciullo and Tenny (1997) offer evidence that supports this analysis. (Their account of this evidence largely overlaps with ours, except that our account is syntactically explicit in linking Asp-VP structure to telicity and simple VP structure to atelicity.) Compounds do not allow the same range of event-modifiers which is reflected in their choice of possible adverbs.

(29) a.   the destruction of the city completely / silently
      b. * city-destroying completely
      c.   city-destroying silently

Where there is a telic Asp phrase, the adverb *completely* is possible, (29a). Where it is absent, then the manner adverb *silently* is possible, (29c), but not the endpoint modifier *completely*, (29b). One can modify the manner of the event, but not the endpoint. This shows that object incorporation is at a VP-level but not at the higher event level (AspP).

Finally, our theory claims that telicity is linked to a node that is subcategorized by the event entailing node (i.e., AspP is subcategorized by TP). It follows that if there is no node associated with Events, there is no telicity representation. Notice, however, that the verb's lexically given event type remains available inside compounds and still produces a reflex of (a)telicity, even without an event entailment. While some verbs (e.g., *kill*) are lexically specified as inherently telic given by what they mean (van Hout 1996), for many verbs (e.g., *mow*, *eat*), the (a)telicity of the predicate depends on the context, i.e., the semantic nature of the object. We can now raise the question whether or not this

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[13] It remains to be explained why (28) is slightly less acceptable than similar examples for *-tion* and *-ing* nominals (see above in (17) and (18)). In general, *-er* nominals have a certain generic property and have a characterizing meaning (Krifka et al. 1995). The event is not anchored in time in the same way as a verb is for instance in the simple past tense or even a *-tion* or *-ing* nominal. We have not discussed the possibility of allowing genericity of the Event node in our representations, but this is probably what conflicts with temporal, manner and rationale modifiers (cf. Sproat 1985; Higginbotham 1997).

lexical event type information is still present in incorporation contexts where there is no fully projected object. Even though no event is entailed by a compound, we see that the incorporation context still allows a telic implication presicely for verbs that are inherently telic, in (30a), while this remains open for flexible verbs, in (30b).

(30)   a.   The lion-killer just walked in.
          b.   The lawn-mower just walked in.

The lion-killer may not have killed a lion yet, but if he were to kill one, we know that this event would have a distinct endpoint. Since *mow* is flexible (not inherently telic) and given that *lawn-mower* does not contain Event nodes (TP in particular), there is no implication of atelic or telic mowing if the lawn-mower were to mow.

6   The licensing of Agents

We now re-address the startling fact about compounds versus nominalizations which points to a structural account: the existence of obligatory agency in the nominalization. We found that *lawn-mower* can be an Agent or instrument, while *mower of the lawn* is exclusively an Agent. This can easily be reproduced with novel constructions: *a tree-trimmer* is an Agent or instrument, but *a trimmer of trees* must be an Agent.

The contrast between *lawn-mower* and *mower of the lawn* suggests that it is the presence of the object which invokes the Agent. This reminds us of Burzio's generalization which, though without a deep explanation, indicates a connection between object Case-absorption and subject dethematization. We suggest that the Agent-Object connection in nominalizations is another version of this phenomenon. We will not solve this problem, but rather seek to set it in a larger context that points to where current theory is deficient. We regard the obligatory Agent as part of a larger "mystery licensing" phenomenon.

A great deal of discussion surrounds the projection of Agents. Roeper (1987) pointed out that an Implicit Agent is able to control a rationale clause and therefore argued that it must be represented syntactically. For nominals like *the use of drugs to go to sleep*, the hypothesis was advanced that the Agent occurred as PRO in the nominal Possessive position, because it was blocked when object preposing occurred: **the drug's use to go to sleep.*[14]

For passives the argument was advanced that Agent must be linked to the *-ed* form to account for the continuing presence of an implied Agent in forms like (31a) which stand in contrast to (31b).

(31)   a.   the dropped plant

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[14] The classic objection, see Williams (1994), that the whole clause is the controller rather than the Agent by itself does not hold for these cases, as one can see if one substitutes the whole clause for the subject:
    (i) *The use of drugs went to sleep.
It is clearly the Agent alone which is the controller. See also Lasnik (1989) for whose approach this objection also holds.

    b. the dropping plant

This position was extensively articulated by Baker, Roberts and Johnson (1989). They make the additional argument that the *-ed* is a pronoun, which can be seen as independent of the idea that *-ed* carries the Agent.

   More recently proposals have been made that the Voice Phrase or small v above VP carries the Agent. This view leads to an intriguing problem. Data on middles (noted by Fellbaum 1985) led to the suggestion (Roeper (pc)) that objects move higher, which led Fajita (1996) to suggest the higher v as the landing site for the verb and its Specifier for the underlying object in middles. Compare (32a) and (32b): (32a) is the unaccusative with no Agent and (32b) is the middle with an implicit Agent.

(32) a. The suitcase easily opens up.
    b. The suitcase opens up easily.

Only if the NP moves into a higher verb's Specifier, and the verb raises up to it as well, will the adverb be left in final position as in (32b). The middle operation allows the object to move into the higher verb. If there is no higher verb, then the verb cannot move above the adverb. In an unaccusative derivation, the underlying object moves up as well, to AgrS, as will the middle subject. However, the latter does so after passing through the Specifier of small v. The difference between unaccusative and middle then is absence versus presence of the small v projection, which is in its way another argument for having Agents introduced by small v.

   The problem now is the following: Where exactly is the Agent in middles? Here is where the "mystery licensing" enters the discussion. If the object occupies the Specifier position of a higher verb, then exactly where and how is the implicit Agent licensed? There is no syntactic position into which to project the Agent anymore. Note that the Agent cannot even occur in a *by*-phrase, (33).

(33) * The suitcase opens up easily by anyone.

Therefore, it remains implicit, but where? Previous theories of implicit Agents linked it to a set of theta-roles carried by the verb. Under the account of Roeper (1993), unprojected "implicit thematic roles" are distinguished from "implicit arguments" precisely in the fact that there is no syntactic position whatsoever which can house them, i.e., no *by*-phrase. But the thematic role is present when the verb is present because it is a lexical property of the verb.

   The evidence presented in the sections above indicates that Agent is a property of the Voice-Event node, whether or not it is syntactically realized. It is no longer an inherent property of the verb. This perspective fits into a view of Functional Categories as licensers. However, their licensing properties are not exhausted by syntactic nodes. The theory is promising, but incomplete, as long as we do not have a more adequate notion of what it means to license implicit information. If we extract the Agent from the verb and seek to locate it in a higher Voice-Event position, then it is unclear what its syntactic status should be. One possibility is to assimilate the concept of Agent to the modern notion of Formal Features: the Voice/Event node carries an Agent Feature. Such a claim

is possible, but not conceptually adequate, since there is no theory of possible Formal Features, nor how Formal Features interact.

An additional observation in the Agent licensing issue is that various features of the Event nodes interact. More than just an Agent is licensed. It is clear that instruments and adjunct rationale clauses require the presence of an Agent as well, (34).

(34)   a.   *   The ball rolled to fool Bill.
        b.   The ball was rolled to fool Bill.
        c.   *   John died by an accident.
        d.   John died by accident.

Example (34c) represents an instrument and is excluded, while (34d) represents the same meaning with a manner-adverbial (see Deng Xiaoping 1991). There is an internal implicational hierarchy that is invoked in the notion of Event. Having an event entailment also gives us the notion of (a)telicity of that event and Agent of the event. To review our claims, the presence of a TP gives an AspP which on its turn gives a Voice-EventP, both by subcategorization. Having an Agent of the event (either implicitly or explicitly) yields the possibility of Agent-related modifiers, such as instrument and rationale clauses. Let us also review the argument for why *the mower of the lawn* cannot be an instrument. We have argued that *-er* must take the Voice-EventP which introduces the agent, and cannot introduce a VP which has a full object but no higher nodes.

We now have arrived at what may be the correct configuration, but the connection between Agent and object remains unexpressed in our account. We believe that it is a part of the larger notion of invoking Event nodes, because the entailments are broader than just Agent and object. But how exactly does the interface with Events work? All of the theories mentioned including our own fail to provide a principled reason for why an object should entail an Agent, which is part of what is Burzio's generalization. This is such a deep principle of grammar that its ultimate statement is not yet within our grasp. The outlines of a larger theory come into view, but it is beyond the scope of this essay: licensing involves properties of Functional Categories that resemble, but exceed the relation of a verb and its complements.

7   Summary and conclusions

Arguing for internal structure in nominalizations, we have proposed that different affixes subcategorize for different morphosyntactic contexts with different semantic implications. Nominalizations with *-tion* (e.g., *the destruction of the city*), *-ing* (e.g., *the mowing of the lawn*) and also *-er* (e.g., *the mower of the lawn*) contain a fullfledged VP including TP, AspP and Voice-EventP (see Borer 1991; Fu, Roeper and Borer 1996; Keyser and Roeper 1997). They have argument positions for both object (the Specifier positions of V or Asp) and subject (the Specifier position of Voice-Event). In this context, there is an event entailment (the eventuality variable gets closed off in TP) and the semantic nature of the object determines the telic or atelic nature of the entailed event (quantized objects move to the specifier of Asp to check off telicity, while non-quantized objects remain in VP yielding an atelic interpretation, see van Hout 1996). *-Er* nominals can also subcategorize for another kind of context: VP. The latter yields compound *-er* nominals such as *lawn-mower*. These are incorporated head structures with only a clitic position for the object (see Keyser and Roeper

1992). Without the appropriate functional nodes (in particular, TP), they cannot not entail an event.

This account follows up on one of the implications of the Minimalist Program (Chomsky 1995), namely that different elements pick out different parts of verbal projections. In our case, *-er* selects either TP or (a lower) VP. Under a pure phrase-structure account, we would expect either an invariant subcategorization for all VP's or no VP at all. However, with Merge and Formal Features, there exists the natural possibility that one can subcategorize for less than a maximal projection. This possibility is already reflected in phrase-structure grammars by having a small variety of choices for VP subcategorizations. Our perspective supports the more abstract view of syntactic principles articulated in Chomsky (1995), where under bare phrase structure, category lablels (N, V, A) are like other Formal Features.[15]

Let us summarize the crucial derivations. We have argued that there is both a TP and an AspP present in nominalizations. The TP is responsible for fixing the event entailment. The AspP is responsible for fixing telicity. Telicity is checked by the quantized object when both the object and the verb move to the Asp node. After the object moves to Asp, the verb moves to TP, satisfying the Event Feature. This captures the telic event entailing property of *the mower of the lawn*. We capture the atelic event entailing properties of *the mower of lawns* by arguing that AspP is not projected when telicity does not need to be checked off. The object can remain in the Specifier of VP. The verb, by itself, moves to TP and triggers the event entailing interpretation. We have proposed a parallel analysis with a full fledged VP structure for *-tion* and *-ing* nominalizations.

As for the derivation of *lawn-mower* with neither telicity nor Event Features, we have argued that the functional nodes above VP are simply not generated. Below VP, the object cliticizes from the clitic-like complement position onto the verb. The combination *lawn+mow* moves up to the *-er* nominal above it to complete the compound. Thus, the *-er* affix itself is free to generate: either TP+AspP +VP, TP+VP, VP, or V by itself.

Although we have not explained it fully, without the functional layers, an *-er* nominal can assume Agent, Theme or instrument. With the functional layers, the *-er* nominal is obligatorily interpreted as the Agent of the entailed event. We have captured this by base-generating nominalization *-er* in the Specifier position of the Voice-Event node, the position where the Agent is introduced.

Finally, let us review our claims about structure within derived forms. We have solved both of our problems by the addition of structure above the VP: the presence of an event entailment and the presence of an obligatory agent reading in *the mower of the lawn*, coupled with the absence of both these

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[15] Subtle lexical variation in subcategorization is found throughout the grammar. Thus, we find that the *wh*-word *why* allows a bare VP (e.g., *Why sing?*) which is not true for other *wh*-words (e.g., **Where sing?*). It is natural, therefore, to allow specific affixes to be generated as higher nodes and choose subcategorizations. See Roeper & Rohrbacher (to appear) for discussion.

properties in *the lawn-mower*. It would be attractive to argue that a single node accomplishes both of these goals. We have argued, however, that several nodes, linked by subcategorization, is a superior solution. For our argument, the concept of event entailment is linked to TP, and checked by verb movement. T selects for AspP which gives telicity. Asp can select Voice-EventP which gives the Agent entailment. The entailment relations from semantics are syntactically expressed by linking the notion of Event to a high functional node which on its turn requires the presence of further, lower functional nodes. We view the Voice-EventP, AspP and TP nodes as real interface points between a simple syntactic representation and significantly more complex semantic notions of voice and Event. The interface is complex because it involves selections from tense to aspects and aspect to voices and further licensing within the verb phrase (instrumentals and rationale clauses) plus the complex factors around Burzio's generalization.

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