On External Arguments

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1. Modes of argument association[*]

In his analysis of action sentences, Donald Davidson drew a clear distinction between arguments and adjuncts. Neglecting temporal distinctions, sentences like

(1)   We bought your slippers in Marrakesh.

are analyzed as

(1')   ∃e [buy(your slippers)(we)(e) & in(Marrakesh)(e)].

In (1'), 'buy' is a three-place predicate. Apart from an Event Argument, it has an argument denoting the agent and another one denoting what was bought (the theme, in the terminology of Gruber 1965). That is, the subject and the object in (1) correspond to arguments of the main predicate in the logical representation (1'), while the locative argument 'Marrakesh' is introduced by a secondary predicate (the preposition 'in'). What (1') says, then, is that there is an event which is a buying of your slippers by us, and which takes place in Marrakesh.

Davidson's distinction between arguments and adjuncts was criticized by Castañeda right after Davidson's talk (Castañeda 1967), and has been abandoned in the work of Parsons. Both Castañeda and Parsons let agents and themes introduce independent predicates as well. For Parsons (not for Castañeda), the independent predicates are two-place predicates denoting thematic relations. On this proposal (inspired by Panini and Fillmore's case grammar, Fillmore 1968), (1) has the logical form (1''):

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[*]Caution
This manuscript was printed out for informal distribution. It reflects the current stage of the first chapter of my monograph *The Event Argument and the Semantics of Voice* (in progress, contracted with MIT Press). No attempt has been made to turn this chapter into an independent article. For example, phrases like "as we will see in chapter XXX" have not been eliminated.

(1'')   ∃e [buying(e) & Agent(we)(e) & Theme(your slippers)(e) & in(Marrakesh)(e)]

(1'') says that there is an event which is a buying, whose agent is us, whose theme are your slippers, and which takes place in Marrakesh. Some terminology will be useful. (1') uses what Dowty 1989 calls the 'ordered-argument' method for the association of agent and theme arguments with their verb. In (1'') we see what Dowty labels the 'neo-Davidsonian' method. On the neo-Davidsoninan method, arguments are associated with their verbs via secondary predicates.

Davidson and Parsons' theories are theories of logical form, where <u>logical form</u> is not the same as the syntacticians' <u>Logical Form</u>, a level of syntactic representation (as in May 1977, 1985). Parsons' logical form is more like the linguists' semantic structure or conceptual structure (as in Bierwisch 1983, 1989, Jackendoff 1983, 1990, Hale and Keyser 1987, 1992, Speas 1990). Parsons 1993 emphasizes that the theory presented in Parsons 1990 is a "proposal for the logical forms of sentences, unsupplemented by an account of how those forms originate by combining sentence parts". In other words, Parsons' theory is a theory of logical or conceptual structure that is not committed to particular claims about argument association in the syntax. It is possible to agree, for example, that English verbs are associated with their arguments by the ordered argument method, and still quarrel about whether their logical or conceptual counterparts are associated by the neo-Davidsonian or by the ordered argument method. Here is an illustration of what such a quarrel would be about.[1]

The first position: Ordered argument association in the syntax and in the semantic representation	
buy	$\lambda x \lambda y \lambda e$ buy(x)(y)(e)

The second position: Ordered argument association in the syntax, neo-Davidsonian argument association in the semantic representation	
buy	$\lambda x \lambda y \lambda e$ [buy(e) & Theme(x)(e) & Agent(y)(e)]

Both proposals agree that the English verb 'buy' is a three-place predicate. The Event Argument is the highest argument, the agent argument comes next, and the theme argument is at the bottom. Note that the hierarchy of arguments is part and parcel of a verb's meaning, and doesn't have to be stipulated. I think of verb meanings in the way semanticists in the Fregean tradition usually do (see e.g. Lewis 1972, Montague 1974). They are functions. Following Schönfinkel 1924, we construe the (classical Davidsonian)

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[1]What follows is the beginning of my presentation at SALT II, Ohio State University at Columbus, May 1992. It is reassuring to see that Parsons 1993 independently presents his syntactic options in very much the same way.

denotation of 'buy' as a function-valued function f which, if applied to an individual, yields a function g which, if applied to an individual b, yields a function h which, if applied to an event c, yields truth if and only if c is an event of b's buying a. Fregean denotations of this kind make it possible to maintain the generalization that predicates and their arguments semantically combine by Functional Application.

What distinguishes the two views presented above is their assumptions about the counterpart of English 'buy' in logical form or conceptual structure. For a classical Davidsonian it would be a three-place predicate as well. For a neo-Davidsonian it would be a predicate with just one argument, the Event Argument. Implemented in this way, the neo-Davidsonian view would have no consequences for the syntactic theory of argument structure, and I would have very little to add to the issue beyond what you find in Parsons' work.

The enterprise that I am about to embark on is of a different nature. In this essay, I want to show that some neo-Davidsonian argument association is present in the syntax of verbs. Not all of a verb's arguments are associated by the ordered argument method. Most importantly, I am going to argue that all external arguments in the sense of Williams 1981 are associated by the neo-Davidsonian method in the syntax. This view has radical consequences for the syntactic theory of argument structure, and as we will see, for syntax as a whole. A verb like 'buy' is now a predicate without external argument. It does not have an agent argument anymore. Here is what its lexical entry looks like:

Severing the external argument from its verb

buy $\lambda x \lambda e\ [buy(x)(e)]$ or $\lambda x \lambda e\ [buying(e)\ \&\ Theme(x)(e)]$

On this proposal, the English verb 'buy' is a two-place predicate in the syntax (I want to stay uncommitted as to its status with respect to logical form or conceptual structure). The inner argument is the theme argument denoting what is being bought. The higher argument is the Event Argument. Since the agent argument is not an argument of 'buy', it has to be added via secondary predication. The challenge for the present proposal is to tell a good story about the addition of external arguments in natural languages, and this is what much of this essay will be about.

2.   External arguments

Most contemporary theories of argument structure assume some kind of asymmetry between the agent argument and the theme argument of a verb like 'buy'. More generally, most theories of argument structure give a special status to the external argument. For Williams 1981, the special status is indicated by underlining. Rappaport and Levin 1986 use angled brackets to distinguish external and internal arguments. For Grimshaw 1990, the external argument is defined as the most prominent argument with
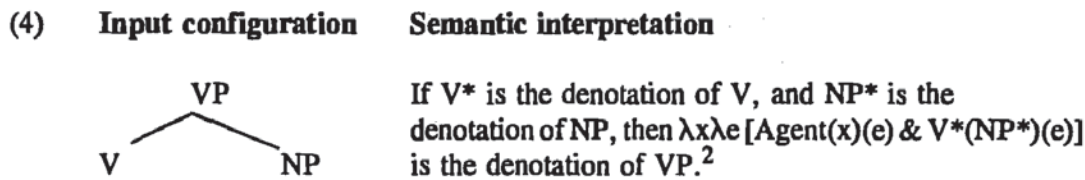
respect to both a thematic and an aspectual dimension. Marantz makes a proposal that comes closest to what I am arguing for here: For him, too, the external argument of a verb is not an argument of the verb. His lexical representations look as follows (neglecting a distinction between internal arguments that is not relevant to the present discussion):

(2) **buy** (theme)
   give (theme, goal)
   steal (theme, source)

In these representations (as in mine), information about the external argument is missing. According to Marantz, the object of a verb is an argument of the verb and is assigned a semantic role by the verb. Subjects are arguments and semantic role assignees of predicates (where 'predicates' is used in the sense of Williams 1980, referring to maximal projections like VPs or APs), and this is why the external argument does not appear in the lexical representation of verbs. Marantz is not explicit about how to execute his proposal. If a verb does not carry any information about the presence of an agent argument, how can the VP it projects acquire this information? Consider a VP that consists of the verb 'buy' and the object NP 'your slippers'. Assuming the usual interpretation mechanisms, semantic composition would proceed via Functional Application in the following fashion:

(3)   **VP** λe [buy(your slippers)(e)]

   V $\lambda x \lambda e$ [buy(x)(e)] **NP** your slippers

   buy   **your slippers**
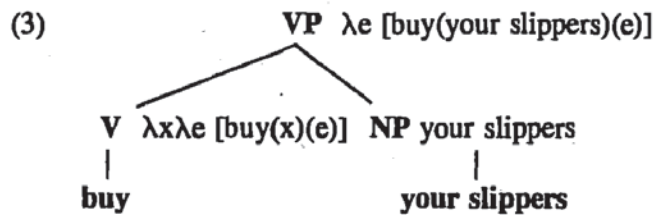
If this is how the meanings of VPs are composed, it is impossible for the VP to have an agent argument, without the V having such an argument to begin with. In the example above, the VP ends up denoting a property of events that is true of any event if it is an event of buying your slippers. No agent argument has come into existence. Trying to maintain Marantz's account, we have to consider the possibility that a verb and its object are not semantically combined via Functional Application. We may associate a special composition rule with syntactic configurations that combine a V and an NP into a VP:

(4) **Input configuration** **Semantic interpretation**

     VP   If V* is the denotation of V, and NP* is the
          denotation of NP, then $\lambda x \lambda e$ [Agent(x)(e) & V*(NP*)(e)]
  V   **NP** is the denotation of VP.[2]

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[2]See Parsons 1985 for a similar rule introducing the external argument at the point where a VP combines with its subject.

Applying this rule yields the right result for our example: An agent argument is added.

(5)   VP λxλe [Agent(x)(e) & buy(your slippers)(e)]

         V λxλe [buy(x)(e)] NP your slippers
         | |
        buy   your slippers
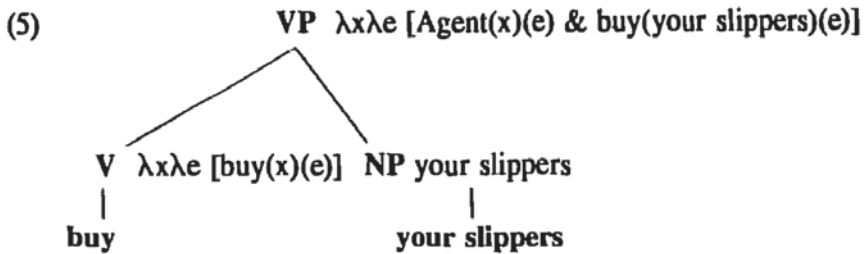
On this proposal, the agent argument is an argument of the VP without being an argument of the V, as desired. This execution of Marantz's proposal does not come for free, however. Its price is a semantic stipulation that would be a blemish for any serious theory of semantic composition (see e.g. Klein & Sag 1985, Fanselow 1984, Higginbotham 1985, Heim and Kratzer 1990 - 1993, von Stechow 1991, Portner 1992, Bittner 1992). We would be forced to give up the fundamental generalization that heads and their arguments semantically combine via Functional Application. Marantz's proposal, then, does not tell an optimal story about the introduction of the external argument.

Yet Marantz presents an important argument supporting the assumption that external arguments are not true arguments of their verbs. He observes that there are many instances where a particular kind of internal argument triggers a particular interpretation of the verb, and claims that there are few (if any) instances where an external argument does the same. Here are some of his examples (Marantz 1984, 25).

(6)   a.   throw a baseball
       b.   throw support behind a candidate
       c.   throw a boxing match (i.e. take a dive)
       d.   throw a party
       e.   throw a fit

(7)   a.   take a book from the shelf
       b.   take a bus to New York
       c.   take a nap
       d.   take an aspirin
       e.   take a letter in shorthand

(8)   a.   kill a cockroach
       b.   kill a conversation
       c.   kill an evening watching T.V.
       d.   kill a bottle (i.e. empty it)
       e.   kill an audience (i.e. wow them)

Marantz points out that these facts follow if external arguments are not true arguments of their verbs. Bresnan 1982b and Grimshaw 1990 reply that they can be equally well

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explained by any theory that has it that external arguments are semantically processed after internal arguments. Since most theories currently on the market are of this kind, Marantz's argument would lose much of its force if Bresnan and Grimshaw were right. While his generalization may very well follow from his assumptions, it couldn't be used to distinguish his theory from most of the others.

"In short, one could capture the subject/non-subject generalization without affecting the lexical representation of predicate argument structure, simply by giving the subject a distinguished role as final argument in the semantic composition of the sentence."
Bresnan 1982b, 350.

"In any theta-marking calculation, the external argument is the last to enter in. Thus, in effect, calculations performed over the internal arguments are done without reference to the external arguments, but any a-structure calculation involving the external argument will of necessity involve the internal ones. The special properties of externals follow from their occupying the position of maximal prominence."
Grimshaw 1990, 35.

What is interesting and highly relevant about the data in (6)-(8) is that the phrases listed there do not involve completely frozen idiom chunks. Consider the expression 'kill an evening'. This is not a real idiom, since we can have variations of the following kind:

(9)   a.   kill an evening (that way)
        b.   kill an afternoon (reading old Gazettes)
        c.   kill a lovely morning (paying overdue bills)

I can think of two ways of approaching these alternations. One possibility is that there is a number of homophonous verbs 'kill', all closely related in meaning. The range of variation for the object in (9) would then indicate that the 'kill' that means 'waste' semantically selects a time interval for its internal argument, that is, it denotes a partial function that is only defined for time intervals. The other verbs 'kill' have different semantic selection properties. If 'kill' is paired with an object that does not denote a time interval, then the 'waste' reading cannot be chosen, since it would lead to uninterpretability. Hence the impression that properties of the internal argument influence the interpretation of the verb. If the phenomenon illustrated by (6) to (8) can be reduced to a very narrow kind of semantic selection, it should be able to show up with any one of the verb's arguments, since a verb can impose any kind of selectional restrictions on any of its arguments regardless of its hierarchical position and the order of semantic processing. By way of illustration, suppose that a two place predicate denotes the (function valued) function f. If we want to impose a selectional restriction on its inner argument, we state that f is only defined for individuals that obey this restriction. If we want to impose a selectional restriction on the outer argument, we state that for any individual a in the domain of f , f(a) is only defined for individuals that satisfy the restriction. If external arguments are true arguments of their verbs, then we

expect verbs to impose selectional restrictions on external arguments that are similar to the ones observed in (6) to (8). If they are not, no comparable selectional restrictions are expected. There would be no way of stating them as part of the verb's meaning.

Marantz does not think of the alternations in (6) to (8) in this way. He is of the opinion that one "would be hard pressed to argue that a different predicate implies a different (homophonous) verb in each case."[3] Suppose that this is so. We would then have a single verb 'kill' whose denotation is a function that does not treat all arguments in the same way. Assuming (just for the purpose of illustration) that 'kill' has its traditional denotation (agent and theme argument, no Event Argument), its denotation would be a function f with the following properties: If its argument is an animate being a, f yields a function that assigns truth to any individual b if b kills a. If its argument is a time interval a, f yields a function that assigns truth to any individual b if b wastes a. If its argument is a conversation or discussion a, f is a function that assigns truth to any individual b if b dampens a. And so on. If this is the correct account of the phenomenon illustrated in (6) to (8), we would again expect that it should affect any argument of the verb, regardless of hierarchical position and order of semantic processing. Any argument of the verb could trigger a particular interpretation of the verb. Here is a fictitious example where the highest argument does so. Suppoose that the (traditional) denotation of some two place predicate is a function f that yields the following output for individuals a in its domain:

(10) If b is a time interval, then f(a)(b) = truth iff a exists during b.
      If b is a place, then f(a)(b) = truth iff a is located at b.
      If b is a person, then f(a)(b) = truth iff b is the legal owner of a.
      ....etc. ....

It is not true, then, that one could capture the subject/non-subject generalization simply by giving the subject a distinguished role as final argument in the semantic composition of the sentence (contra Bresnan and Grimshaw). There is no technical obstacle to having verb meanings like the function f if external arguments are true arguments of their verbs. If they are not, Marantz's generalization is expected, however. This means that Marantz's data are very suitable indeed for deciding between theories that assume that external arguments are true arguments of verbs from those that maintain that they are not.

Consider now the following sentences:

(11) a.   Aspirin helped me.
      b.   Maria helped me.

(12) a.   The performance grabbed Maria.
      b.   A stranger grabbed Maria.

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[3]Marantz 1984, p.25

(13)   a.   The stew fed the entire army.
        b.   Mother Courage fed the entire army.

(14)   a.   The glasses emphasized her intelligence.
        b.   Her teacher emphasized her intelligence.

The alternations in (11) to (14) look very much like the ones we saw in (6) to (8). But this time, the <u>external</u> argument is responsible for the alternation in verb meaning. Take (12). When the subject of 'grab' denotes a non-animate entity, the verb is interpreted as an experiencer verb. When it denotes an animate entity, 'grab' can be interpreted as an action verb or as an experiencer verb, depending on the circumstances. (An actor may physically or mentally grab Maria, for example.) Don't try to tell me that the subjects of those verbs may not be external arguments. Their German counterparts require the auxiliary 'haben' on any reading, a reliable diagnostic for the presence of an external argument. Analogous facts exist in Italian (Pesetsky 1982 contra Belletti and Rizzi 1988). Sentences (11) to (14), then, seem to present a serious challenge to the claim that external arguments are not true arguments of their verbs. in (11) to (14), the verbs seem to impose lexical requirements on their external arguments, but this shouldn't be possible if lexical entries of verbs contain no information about external arguments.

We will see in the following section that examples (11) to (14) are not at all like the Marantz cases. Not only do they not threaten the claim that external arguments are not true arguments of their verbs. They even provide strong support for the idea that external arguments are added via neo-Davidsonian secondary predication. In order to arrive at this conclusion, we have to take a closer look at the mechanics of external argument addition.

3.   The mechanics of external argument addition

How are extrenal arguments introduced? Suppose that quite generally, arguments are introduced by heads. This helps keep the theory of semantic composition as general and elegant as it should be. If external arguments are not true arguments of their verbs, it now follows that they must be introduced by independent heads. To get a first idea about how this may work, it will be useful to turn to a language that has overt devices for introducing external arguments.

In her paper "The Structure of Derived Nouns and Verbs in Malagasy: A Syntactic Account"[4], Henrietta Hung proposes that the agent argument of active sentences in Malagasy is introduced by a prefix 'an-' that heads a higher VP in a layered structure of the following kind:

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[4]I am indebted to Lisa Travis for informing me about Hung's work.

(15).
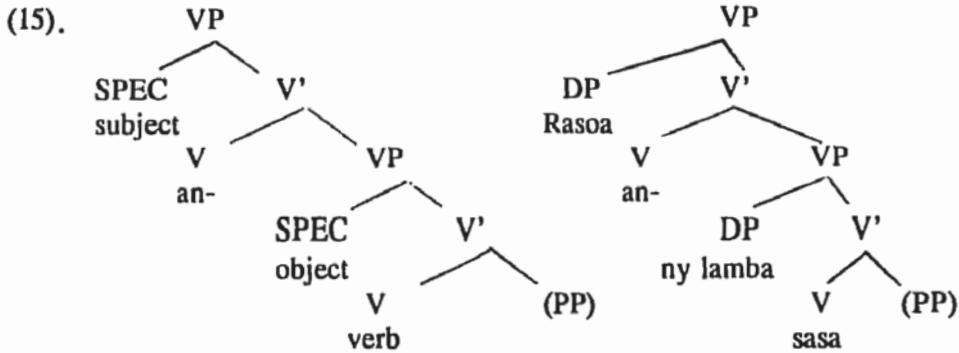
The layered VP structure was originally proposed in Larson (1988) to account for certain properties of the double object construction. In contrast to Larson, Hung assumes that the higher V-node is empty, but hosts a lexical element that selects the agent argument. Movement of the lower verb to the higher V-position allows the agent affix to incorporate into the verb.[5] Further movement of 'an'+verb into I and of the subject into SPEC of IP produces a sentence like (16).[6]

(16)   Manasa   ny lamba (amin ny savony) Rasoa.
       m-an-sasa
       wash+active the clothes (with the soap)   Rasoa
   'Rasoa washes the clothes with the soap.'

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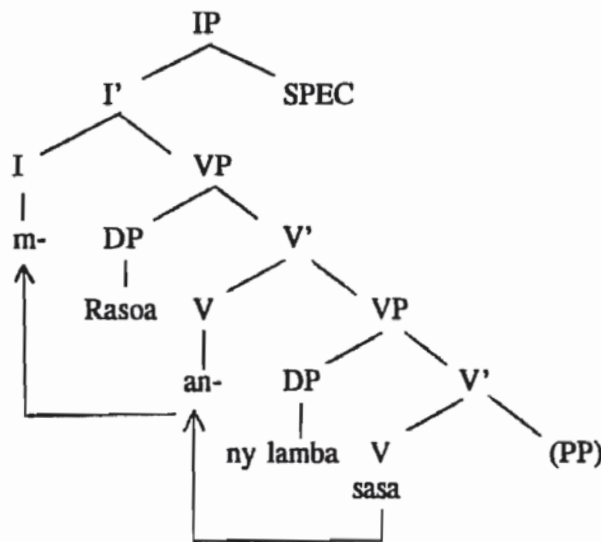
[5]Baker 1988.

[6]A related proposal is made in Speas 1990 for English. Speas assumes with Hale and Keyser 1987 that agentive predicates have a higher verb 'do' in their lexical conceptual structure. Consequently, they project an extra verbal head at D-structure. The result are structures of the kind that Larson proposes for double object constructions. Hale and Keyser's proposal is not compatible with my earlier arguments that information about the presence of an agent argument should not be part of the lexical representation of action verbs at all.

Hung reports that "while the root <u>sasa</u> is not a word in itself, it is recognized by speakers as being a root with the meaning 'being washed' or 'having the quality of being washed'. It therefore acts (along with an optional instrument) as a V' predicate of the theme <u>ny lamba</u>. The complete reading of the sentence is thus something like 'I caused the clothes to be washed (with soap)', or rather 'I did the (soap) washing of the clothes''.[7] Hung takes 'an-' to be a light verb like 'do' that has two functions. It adds the agent argument and it assigns case to the object.

If Hung is right, the suffix 'an-' is the kind of lexical item that languages are expected to have if agent arguments are associated via neo-Davidsonian secondary predication. Let us see what the semantics of 'an-' would have to look like. I will introduce the semantic framework by working through an example.

(17)   **Example:**
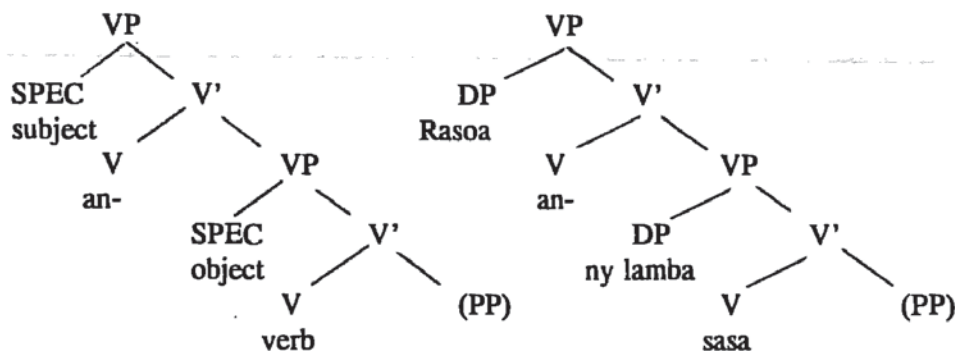
1.   sasa* $= \lambda x_e \lambda e_s$ wash(x)(e)
2.   **ny lamba*** $=$ the clothes
3.   (sasa ny lamba)* $= \lambda e_s$ wash(the clothes)(e)
     From (1), (2) by Functional Application.
4.   (an-)* $= \lambda x_e \lambda e_s$ Agent (x)(e)
5.   (an-(sasa ny lamba))* $= \lambda x_e \lambda e_s$[Agent(x)(e) & wash(the clothes)(e)]
     From (3), (4) by Event Identification.
6.   **Rasoa*** $=$ Rasoa
7.   ((an-(sasa ny lamba) Rasoa))*
     $=\lambda e_s$[Agent(Rasoa)(e) & wash(the clothes)(e)]
     From (5), (6) by Functional Application.

This calculation is a step by step derivation of the denotation of the VP of example (16) (without the PP). Since the subject NP eventually moves to the SPEC position of IP, the actual calculation would involve an NP trace rather than the full NP 'Rasoa', but this doesn't make a difference for the current discussion. Moved heads are restored before

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[7]Hung 1988, p. 12.

semantic interpretation. Alternatively, the effect of restoration (without actual restoration) could also be achieved by abstraction over the variable corresponding to the trace left by movement, provided that the semantic type of the trace matches the semantic type of the moved element (von Stechow 1991, Bittner 1992, Rullmann (forthcoming)). The interpretation process assigns denotations to bracketed strings of lexical items in a type-driven fashion (Klein&Sag 1985). For any string α, α^* is the denotation of α. Denotations are individuals, events, truth-values, and functions construed from those entities. They are given through expressions of an extensional type logic with three basic types: Individuals (type e), events (type s), and truth-values (type t). The denotations of lexical items are provided by the morphological component. To calculate the denotations of complex expressions, we have a handful of composition principles that apply freely whenever they can (Fanselow 1985, Higginbotham 1985, Heim and Kratzer 1990-1993, Portner 1992, Bittner 1992). In this particular example, the applicable composition principles are Functional Application and a principle I dubbed 'Event Identification'.[8] Event Identification is a special kind of conjunction and can be stated as follows.

(18)   **Event Identification:**

$$\begin{array}{ccc} \mathbf{f} & \mathbf{g} & \to \quad \mathbf{h} \\ <e,<s,t> & <s,t> & <e,<s,t>> \end{array}$$
$$\lambda x_e \lambda e_s [f(x)(e) \ \& \ g(e)]$$

Event Identification makes it possible to chain together various conditions for the event described by a sentence. It takes a function f and a function g (order irrelevant) as input and yields a function h as output. Input functions f and output functions h are of type $<e,<s,t>>$. Input functions g are of type $<s,t>$. If s is the type of events, e the type of individuals, and t the type of truth-values, then entities of type $<s,t>$ are functions from events to truth-values, and entities of type $<e,<s,t>>$ are functions that map individuals to functionals from events to truth-values.[9] The lambda expression defines the output function h in terms of the input functions f and g. In the computation above (step 5), Event Identification achieves the following:

(19)   **Example of Event Identification**

$$\begin{array}{ccc} \mathbf{f} & \mathbf{g} & \to \quad \mathbf{h} \\ <e,<s,t>> & <s,t> & <e,<s,t>> \end{array}$$
$$\lambda x_e \lambda e_s \text{Agent}(x)(e) \quad \lambda e_s \text{wash(the clothes)}(e) \quad \lambda x_e \lambda e_s [\text{Agent}(x)(e) \& \text{wash(the clothes)}(e)]$$

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[8]The term is reminiscent of Higginbotham's term 'Theta Identification'. Higginbotham 1985.

[9]In an intensional version, e would be the type of possible individuals, s the type of possible events, and t the type of propositions, where propositions are sets of possible worlds or situations. Note that the resulting intensional language is different from Montague's intensional logic, even though I am using the same type names. The kind of intensional language I have in mind is a λ-categorial language (Cresswell 1973), with an additional basic type of events.

If the addition of the external argument proceeds via the operation of Event Identification, we expect a connection between the Aktionsart of the verb and the thematic role of its external argument. What are Aktionsarten? I'd like to think of them as originating from selectional restrictions for the Event Argument. Not an entirely orthodox use of the term, but a useful one.[10] Event Arguments may be restricted to actions, states, events proper, and so on. An action predicate like 'wash the clothes', then, expresses a partial function that is only defined for actions. A stative predicate like 'own the clothes' expresses a partial function that is only defined for states. Actions and states are subkinds of events (or 'eventualities' in the terminology of Bach 1977). That is, they are both entities of type s. The operation of Event Identification is only defined if the two predicates that are being conjoined have compatible Aktionsarten. Let us look at an example.

(20)   Rasoa owns the clothes.

In (20), the verb is stative, and the external argument denotes the person who is the holder of the state consisting of owning the clothes. To compute the meaning of (20), we need a head adding the external argument, call it 'Holder' for convenience. We have then:

(21)   **Holder*** $= \lambda x_e \lambda s_s \, holder(x)(s)$
        own the clothes* $= \lambda s_s \, own(the \, clothes)(s)$

In spelling out the denotations for 'Holder' and 'own', I used the metalanguage variable 's' (for 'state', not to be confused with the semantic type s) to indicate a restriction to eventualities that are states. Since the event Arguments of both predicates are restricted to states, Event Identification can proceed as before, no clash so far. What we cannot do, however, is combine the holder function with the denotation of an action predicate or the agent function with the denotation of a stative predicate. Supposing that the set of actions and the set of states are disjoint, the operation of Event Identification comes out undefined in those cases. Given the two input functions, there is no output funtion of the required kind. This, then, explains why there is a connection between the Aktionsart of a verb and the thematic role of its external argument. The connection is forced by the operation of Event Identification.

We are now ready to return to the examples that seemed to pose a problem for us at the end of the last section.

(22)   a.   Aspirin helped me.
        b.   Maria helped me.

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[10]My use of the term 'Aktionsart'corresponds very closely to the notion 'situation type' in Smith 1991. I do not want to commit myself to her particular inventory of situation types, however. In particular, I would have to recognize actions as one of the linguistically most significant situation types.

(23) a. The performance grabbed Maria.
    b. A stranger grabbed Maria.

(24) a. The stew fed the entire army.
    b. Mother Courage fed the entire army.

(25) a. The glasses emphasized her intelligence.
    b. Her teacher emphasized her intelligence.

Recall that these cases seemed to challenge our analysis, since the choice of the external argument seemed to trigger an alternation in verb meaning. What is striking about (22) to (25), however, is that each alternation consists in the pairing of an Aktionsart and a thematic relation. Agent arguments go with action verbs (the (b) examples), and cause arguments go with non-action verbs (the (a) examples). Since agents must be animate, and causes may or may not be animate, external arguments that denote non-animate entities force the non-action interpretation, while external arguments that denote animate entities are compatible with both interpretations. This means that the influence of the external argument on the interpretation of the verb does not have to be due to a direct selectional relationship between verbs and their external arguments, but can be attributed to the connection between Aktionsart and thematic relations forced by the fact that external arguments are attached by neo-Davidsonian secondary predication.

On the present account, any semantic connection between verbs and their external arguments must be mediated by the Event Argument, whereas verbs can directly select their internal arguments. The two types of arguments, then, are predicted to give rise to different types of verb alternations. Internal arguments trigger alternations in verb meaning that may come about through just about any imaginable semantic condition that verbs may impose. External arguments can only trigger alternations that are based on restrictions for admissible combinations of Aktionsarten and thematic relations. This asymmetry is a real one in the languages I have investigated (English and German). Examples (22) to (25) seem representative. Hence there is initial support for a theory that associates external arguments via neo-Davidsonian secondary predication.

4. Introducing Voice

I have argued that external arguments are introduced by independent heads, and we have seen an overt example of such a head in Malagasy. Let us now return to English.

(26) **Elsa** wrote those poems with this pen.
(27) **Franz** read the poems on this sofa.
(28) **George** sold the sofa to my aunt.

On the story that I am in the midst of telling, we are assuming that in sentences (26) to (28), the agent argument is introduced by a non-overt head. What kind of a head? Hung proposes that corresponding heads in Malagasy are verbs. I have a couple of qualms

with this proposal. If external arguments are introduced by verbs, what is it that makes their introduction obligatory in sentences (26) to (28)? We may try out the idea that verbs like 'write', 'read', and 'sell' have an empty incorporated preverb whose existence is forced by a morphological requirement. Without the preverb, then, these verbs would not be morphologically well-formed. We'll see below, however, that the head that introduces the external arguments is not always present. If it is a lexical head, its defective distribution comes as a surprise. It is not a familiar phenomenon. But if it is an inflectional head, it is expected that it must be present in some constructions, and absent in others. In particular, it must be present in finite constructions. This explains its obligatoriness in (26) to (28).

My second qualm with Hung's proposal has to do with case assignment. Hung proposes that 'an-' is a sister of VP. In this position, it can assign structural case via government to the object in the SPEC of VP position.

(29)
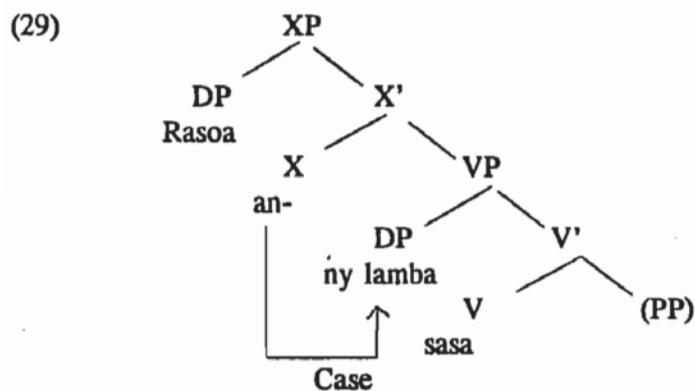
Most traditional and contemporary syntacticians rely on a notion of structural or grammatical case that is distinguished from lexical case. Structural cases are nominative and accusative, lexical cases are cases like ablative, locative, and instrumental. The status of dative is and has been controversial.[11] What is structural case? Consider the following characterization:

(30) **Structural case**
Structural case is case that is assigned by inflectional (=functional) elements.

Some such assumption is made in much recent work. Chomsky 1991, 1992 proposes that

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[11]"Man teilt Kasus der idg. Sprachen ihrer ursprünglichen Natur nach ein in *lokale*, d.h. solche, die irgend ein räumliches Verhältnis zur Vorstellung bringen, und *grammatische*, d.h. solche, die eine rein grammatische Beziehung des Nomens zu einem anderen Satzteil ausdrücken; WUNDT spricht statt dessen von Kasus der äusseren und inneren Determination, MARTY unterscheidet relative und korrelative Beziehungen. Allgemein rechnet man zu den lokalen Kasus den Abl., Lok. und Instr., zu den grammatischen den Nom. und Akk. über Zugehörigkeit des Dativs aber zur einen oder zur andern Gruppe ist veil gestritten woredn....."
Brugmann 1913, p. 428.

strutural case for objects is not assigned by the verb, but by some functional head right above VP. If the head that introduces the external argument is not a lexical, but a functional element, we can maintain that it assigns accusative case, while preserving the generalization that structural or grammatical case is assigned by functional heads.

Assuming that the heads that introduce external arguments are functional heads, we are able to connect our analysis to a proposal for English phrase structure made in Johnson 1991. Johnson postulates an unidentified functional head μ that is a sister of VP, and to which the verb must adjoin.[12] He argues that object NPs must move to the specifier of VP, and that the force that drives this movement is the necessity for object NPs to be assigned structural case from μ via government:

(31)
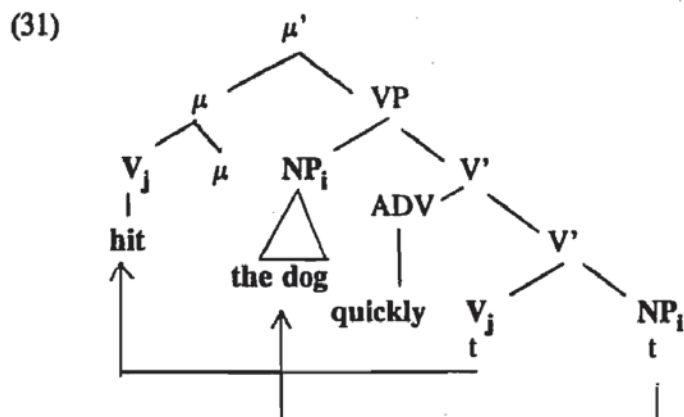
If NPs and only NPs move to the specifier of VP, it follows that they precede adverbs and other complements of the verb. This is illustrated by the following examples (from Johnson 1991, 580):

(32) a.   *Gary introduced to Sam Mittie.
      b.   *Gary told to leave Sam.
      c.   *Mikey visited quietly his parents.
      d.   *Chris hit quickly the dog.
      e.   Chris walked quickly down the street.
      f.   Mikey talked slowly to Gary.
      g.   Gary tried diligently to leave.

(32a-d) are ungrammatical since the object NP has not moved to the specifier of VP. (32e-g) show that only NPs must undergo this movement.

What I want to suggest is that Johnson's μ is a head that introduces the external argument. To give it a name, let us call it 'Voice'. This name is not an arbitrary choice. I believe that what I just dubbed 'Voice' is at the heart of the phenomenon of

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[12]Johnson refers to work by Pesetsky and Jaeggli and Hyams for further discussion of this head: Pesetsky 1989 and Jaeggli & Hyams 1989.

voice in natural languages. The properties of our voice heads square well with traditional views of voice, too. Brugmann characterizes the genera verbi as follows:

"Die Genera im weitesten Sinn bezeichnen objektive Zustandsbegriffe eines Vorgangs schlechthin (Aktionsarten...) oder im Hinblick auf den Träger der Handlung, der tätig oder leidend beteiligt sein kann .... oder von der Handlung irgendeine Rückwirkung erfährt...."
Brugmann 1913, 525

For Brugmann, voice may characterize a process in terms of Aktionsarten or in terms of the one who performs or undergoes the action (active versus passive), or experiences some repercussion of the action (middle). What is interesting about Brugmann's view is that he is aware of the connection between voice and Aktionsart that is implied by our analysis.

The relationship between external arguments and voice is apparent in Benveniste's characterization of voice (never mind that he uses the term 'subject', not 'external argument'):

"There remain mood, tense, and, over and above everything else "voice", which is the fundamental diathesis of the subject in the verb..."
Benveniste 1971 (originally 1966), 146.

In the generativist tradition, voice heads have been proposed for a number of languages. Rivero 1990 postulates an inflectional head labelled 'Voice' right above VP for Greek and Albanian. Following Bowers 1990 (see also Bowers 1991), Mitchell's analysis of Finnish case relies on a functional projection ('Predicate Phrase') whose specifier position is the site where external arguments are base-generated (Mitchell 1991).

Is there any strong motivation for placing the voice head right above VP? Rivero presents two arguments in support of this assumption. If we assume with Roberts 1987 and Baker, Johnson and Roberts 1989 that passive inflection is a realization of the external argument of the verb, by which it is assigned case and theta-marked, we expect some tight locality condition between Voice and verb, since theta-marking and case assignment are local relations. My voice heads are not arguments, and I will present arguments against this assumption below. Consequently, Rivero's first argument yields no support for the analysis presented here. Rivero's second argument comes from certain verb forms in Modern Greek and Albanian which she claims have an overt mediopassive affix that is adjacent to the verb root. This argument was challenged by Joseph and Smirniotopoulos 1993 for Modern Greek. Rivero parses the verb 'plfθikan' ('they were washed/they washed themselves') as follows (gloss and spelling are from Joseph and Smirniotopoulos):

(33)   plf - θ - ik - a - n
   Root Voice Aspect Tense AGR

Joseph and Smirniotopoulos point out that '-ik' is not exclusively an aspect marker, rather it "marks nonactive voice, past tense, and perfective aspect all together" (p. 391). This is shown by the fact that 'pliθún' is nonactive and perfective but not past, 'plínane' is past and perfective but active, and 'plénondan' is nonactive and past but not perfective. While I do not think that these data show that Modern Greek doesn't have independent heads for Voice, Aspect, and Tense, I agree with Joseph and Smirniotopoulos that no evidence has been given that it does. Modern Greek, then, doesn't help us with the question where voice heads are located with respect to other inflectional heads.

While I have argued that the external argument is not an argument of its verb, there is nothing in my proposal so far that would exclude voice heads that <u>also</u> carry temporal or aspectual information. That is, in the absence of evidence to the contrary, there is no semantic obstacle to having voice heads with denotations of the following kind:

(34) $\lambda x_e \lambda e_s$ [agent(x)(e) & past(e) & accomplishment(e)]

The question whether an affix like Modern Greek '-ik-' is the morphological spell-out of one or several inflectional heads, then, cannot be answered by the semantics. It could go either way.

It will be useful to know about the constraints that the semantics imposes on possible locations for Voice. If the semantic connection between Voice and its verb is established by the operation of Event Identification, Voice can appear anywhere in the hierarchy of a verb's inflectional heads, as long as the Event Argument is not existentially quantified. Let me illustrate this point by returning to the computation of the denotation of the Malagasy example.

(35)
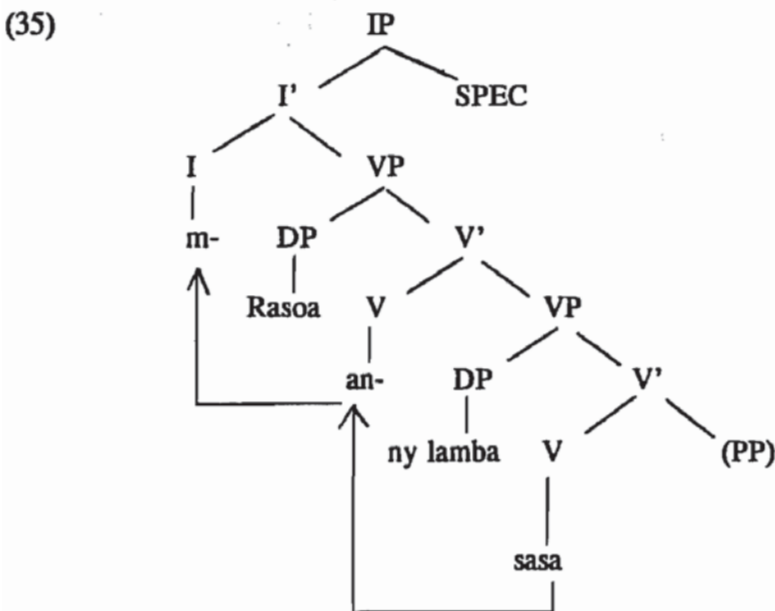
We saw that the higher VP in this sentence receives the following denotation:

(36)   ((an-(sasa ny lamba) Rasoa))*
        $= \lambda e_s[\text{Agent(Rasoa)}(e) \ \& \ \text{wash(the clothes)}(e)]$

This VP, then, denotes a property of events, and not yet a truth-value, the canonical denotation for a sentence within an extensional semantics. One possibility for getting us to a truth-value is to build existential quantification into the semantics of I (Higginbotham 1985). Hung does not attribute any particular meaning to the affix 'm-' apart from "preventing further word-building" (p. 6.) Let us assume, then, that its function is (minimally) to existentially quantify the Event Argument. Here is its denotation:

(37) $\text{m-*} = \lambda P_{<s,t>} \exists e_s P(e)$

The denotation of the IP in (35) is now a truth-value, as can be seen from the following computation.

(38)   (m-((an-(sasa ny lamba) Rasoa)))*
        $= \lambda P_{<s,t>} \exists e_s P(e) \ (\lambda e_s[\text{Agent(Rasoa)}(e) \ \& \ \text{wash(the clothes)}(e)]) =$
        $= \exists e_s[\text{Agent(Rasoa)}(e) \ \& \ \text{wash(the clothes)}(e)]$
        From (35), (36) by Functional Application and two instances of Lambda Conversion.

Once the Event Argument is existentially quantified, the operation of Event Identification becomes inapplicable. From this, we conclude that Voice cannot appear above whatever head existentially quantifies the Event Argument. If we have more than one inflectional head in addition to Voice (possibly all of Tense, Mood, and Aspect), we still have to find out which head does the existential quantification. What we have learned already, however, is which possibilities for the location of Voice are permitted by the semantics of Voice. I will briefly come back to the location issue in Chapter XXX. In the meantime, let us tentatively assume that Voice is located directly above VP, but stay open to the possibility that it may turn out that there are intervening inflectional heads after all. In this case, the verb's object would have to move further up to receive accusative case.

I have argued that the heads that introduce external arguments are inflectional elements that assign accusative case. The following section will present more support for the existence of such heads.

5.   Gerunds and participles: Windows into the hierarchy of inflectional heads

Gerunds and participles are hybrids that share properties with two syntactic categories. Gerunds have verbal and nominal properties. Participles have verbal and adjectival properties. Over the years, a number of scholars have argued that different kinds of gerunds arise from nominalizing different segments of a verb's projection, and that this

is what accounts for their hybrid nature (Grimshaw and Selkirk 1976, Jackendoff 1977, Borer 1984, 1990, forthcoming, Baker 1985b, Abney 1987, Zucchi 1988, Hazout 1990). Abney, for example, proposes that the English nominalizing affix '-ing' can attach to Vs, VPs or IPs, thereby giving rise to of_{ing}, $poss_{ing}$, and acc_{ing} gerunds:

(39) a. of_{ing} His rebuilding of the barn took five months.
      b. $poss_{ing}$ We remember his rebuilding the barn.
      c. acc_{ing} We remember him rebuilding the barn.

(40) **Illustration of Abney's analysis of gerunds**
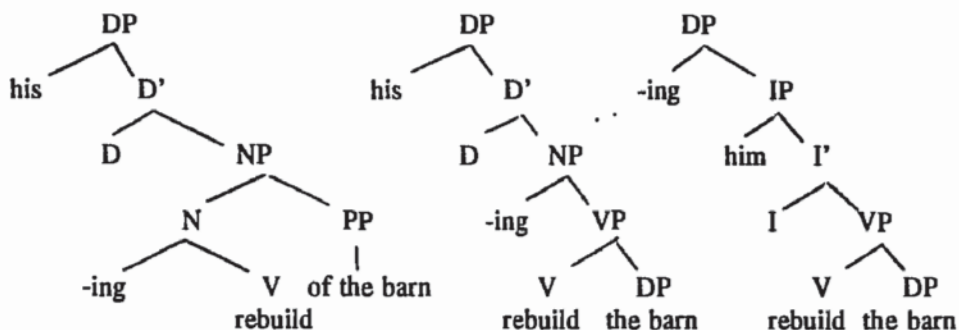
If we say that different kinds of gerunds are created by nominalizing different segments of verbal projections, we understand the term 'verbal projection' in an extended sense. Abney distinguishes s-projection (semantic projection) from c-projection (category projection). For him, the maximal c-projection of V, I and C are VP, IP and CP respectively, and the maximal s-projection of V, I and C is CP. Grimshaw 1991 uses the term 'extended projection' in very much the sense of Abney's s-projection. Assuming a more articulated sentence structure, the extended projection of verbs might include Tense Phrases, Aspect Phrases, Voice Phrases, Agreement Phrases and the like. Gerunds, then, are formed by nominalizing different segments of a verb's extended projection.

Jackendoff 1977 and Abney 1987 suggest that we might expect other affixes to behave like '-ing' in attaching to lexical or phrasal elements. Both authors think that the English passive participle morpheme '-en' is a case in question, and consider the possibility that '-en' is an affix that turns verbal projections into adjectives. If it attaches to a phrasal element, it attaches to a VP, and the result is a phrasal passive. If it attaches to a lexical element, it attaches to a V, and this yields a lexical passive. A very similar view is expressed in Borer 1984.

If different kinds of gerunds and participles result from affixation to different segments of extended verbal projections, we expect these hybrid structures to offer an ideal window into the hierarchy of inflectional heads. This becomes clear as soon as we incorporate Jackendoff's and Abney's insights into the present approach. Let us return to the English gerunds for the remainder of this section. Participles will be the topic of chapters 2 and 4.

Assuming the theory presented so far, the fact that the direct object in an of$_{ing}$ gerund cannot receive accusative case has to be taken as a sign that the nominalized constituent doesn't contain Voice, hence can be at most a VP. This is compatible with it being a V. Suppose it is a V. In example (39a), it would then be the verb 'rebuild' that is nominalized. The interpretation of the gerund would proceed as follows: The denotation of the verb is inherited by the N-node (assuming that '-ing' adds at most aspectual information, a contribution that we can afford to ignore here). This means that the denotation of the N-node is the function $\lambda x \lambda e$ rebuild(x)(e). The N-node, then, requires an argument denoting what is being built. This argument is realized by an NP, and since this NP is an object of a noun, it is case-marked in the way objects of nouns are usually case-marked. Since there is no Voice, there cannot be an agent argument. This last conclusion seems to be contradicted by sentence (39a). Doesn't the genitive pronoun 'his' express the agent argument? That is doesn't is brought out more clearly by the following example.

(40)   Maria'a reading of Pride and Prejudice received better reviews than Anna's.

To be sure, (40) is compatible with Maria and Anna being the agents of their respective readings of Pride and Prejudice. Yet (40) does not have to be understood that way. Suppose the 180th anniversary of the publication of Pride and Prejudice is celebrated with readings in every public library. Maria attends a reading in Conway, Anna attends a reading in Ashfield. In this context, we may understand (40) as reporting that the reading of Pride and Prejudice that Maria attended received better reviews than the one Anna went to. The genitive NPs in (39a) and (40), then, express a general notion of relatedness of which the agent relation is but a special case. I conclude that in of$_{ing}$ gerunds, the absence of accusative case is accompanied by the absence of the verb's external argument. This is further confirmed by the following 'control' facts which are modelled after Wasow & Roeper 1972.

(41)   Maria enjoyed a reading of Pride and Prejudice.
(42)   The killing of her cat upset Maria.

In the absence of Voice, the denotation of 'reading of Pride and Prejudice' denotes the function λe reading (Pride and Prejudice)(e). The whole sentence, then, states that there was an event in which Pride and Prejudice was read and Maria enjoyed this event. This interpretation leaves it open whether Maria or somebody else did the reading. Similar considerations apply to (42). 'Killing of her cat' denotes the function λe killing (her cat)(e). Consequently, (42) means that there was a unique event in which Maria's cat was killed, and this event upset Maria. Again, the sentence is compatible with Maria or someone else killing the cat.

If it is VPs that are nominalized in of$_{ing}$ gerunds, the semantic interpretation proceeds in essentially the same way, and the genitive NP and 'control' facts are predicted to be the same. The only difference is that the object of the verb is saturated in the local domain of the verb, rather than in the local domain of the noun. Since the nominalized constituent doesn't include Voice, the object still cannot receive accusative

case. There are some clear instances of VP gerunds in English. The following examples are from Jespersen 1940,109.

(43)   The shutting of the gates regularly at ten o'clock had rendered our residence very irksome to me.
(44)   From the daily reading of the bible aloud to his mother...

(43) and (44) both contain adverbs ('regularly' and 'aloud'). Since adverbs must modify verbs, we can conclude that what is nominalized is <u>at least</u> a VP. Moreover, the verb is unable to assign accusative case. On the present approach, this is a sign that the nominalized constituent is <u>at most</u> a VP.

Given that direct objects in $poss_{ing}$ and acc_{ing} gerunds are marked accusative, our approach forces us to depart from Abney and assume that neither construction is a nominalization of a VP. The constituent that is nominalized must at least include Voice. Otherwise, structural accusative could not be assigned. Suppose that only zero or maximal projections, but no intermediate projections can be nominalized. We can now infer that the nominalized constituent in $poss_{ing}$ and acc_{ing} gerunds must at least include the maximal projection of Voice. Then it must include the agent argument. That it does is shown by the following examples:

(45)   We remembered Maria's reading <u>Pride and Prejudice</u>.
(46)   We remembered Maria reading <u>Pride and Prejudice</u>.

In (45) and (46), Maria can only be understood as the agent of the reading event. If the agent argument isn't overt in a $poss_{ing}$ gerund, it is realized by PRO. If PRO must be controlled, it follows that $poss_{ing}$ gerunds show obligatory control. This is illustrated by sentences (47) and (48) (again modelled after Wasow and Roeper 1972).

(47)   Maria enjoyed reading <u>Pride and Prejudice</u>.
(48)   Killing her cat upset Maria.

(47) implies that Maria herself read <u>Pride and Prejudice</u>. And (48) implies that Maria herself killed her cat. The control contrast between (41) and (42) on the one hand, and (47) and (48) on the other is accounted for if one and the same head assigns accusative case and introduces the external argument.

The discussion of English gerunds confirmed our claim that external arguments are introduced by independent heads that are also responsible for the assignment of accusative case. The relevant properties of the three kinds of gerunds follow now simply from the assumption that the nominalizing affix '-ing' can attach at least to V, VP, and VoiceP. No other stipulations are necessary.

It may be instructive to compare the analysis of gerunds presented here with an otherwise fairly compatible analysis that is based on the assumption that external arguments are arguments of their verbs. Take Borer 1984, where the properties of the

suffix '-ing' in of$_{ing}$ gerunds are described as follows:

(49)   a.   It triggers a category change from V to N.
         b.   The ability to assign accusative is eliminated.
         c.   It obligatorily selects an agent Θ-role.
         d.   An aspectual (progressive) reading is added.

Borer argues that the first three of those properties violate the Projection Principle of Chomsky 1981, which requires that all lexical features must be represented at every syntactic level. From this she concludes that the formation of of$_{ing}$ gerunds takes place in the lexicon, and not in the syntax. Let us look at the four properties in turn. Property (a) is not a violation of the Projection Principle if we assume with Höhle 1976, 1982 and Williams 1981 that affixes may belong to syntactic categories and head words. The category change in gerunds, then, is not a change in features, but the result of attaching an affix that is an N. On the approach advocated here, the verb's ability to assign accusative case is not eliminated in of$_{ing}$ gerunds since it was never there to begin with. As for property (c), we have seen above that it is not a property that of$_{ing}$ gerunds have. They do not have an obligatory agent argument. Again, this does not come as a surprise to us. If there never was an external argument, none has to be eliminated. These gerunds, then, do not violate the Projection Principle. While they may very well involve affixation of '-ing' to a lexical category (that is, V as opposed to VP), there is no reason to assume that this affixation is a process that takes place in the lexicon. In fact, the assumption that of$_{ing}$ gerunds are formed in the lexicon runs into at least two serious difficulties. The first one is that it would not explain why (even though the lexicon is assumed to be the place where lexical requirements can be violated) of$_{ing}$ gerunds <u>must</u> preserve the internal arguments of the verb, as demonstrated by Lebeaux 1986 (see also Grimshaw 1990):

(50)   a.   They felled *(trees).
         b.   The felling *(of the trees)

(51)   a.   They destroyed *(the city).
         b.   The destroying *(of the city)

The second serious obstacle to the assumption that of$_{ing}$ gerunds are formed in the lexicon is the fact that they may (at least optionally) be formed by attaching '-ing' to a phrasal constituent. The evidence comes from the presence of adverbs in Jespersen's examples repeated from above:

(52)   The shutting of the gates regularly at ten o'clock had rendered our residence very irksome to me.
(53)   From the daily reading of the bible aloud to his mother...

I conclude that of$_{ing}$ gerunds are formed in the syntax. On the approach defended here, this is possible without giving up the principle that lexical information is preserved at all syntactic levels of representation.

6.   Abolishing the notion 'external argument'

The discussion in the previous sections makes it possible to do away with the notion of 'external argument' (Williams 1981). This notion has no theoretical significance anymore. It does not figure in any theoretical statement. While I will continue to use Williams' term 'external argument' informally for arguments like the agent argument in active sentences, this term has now acquired a different meaning. Strictly speaking, the agent argument of a verb is not really one of its arguments anymore. Here is an illustration of the different kinds of arguments in the present framework:

(54)   We bought your slippers in Marrakesh.
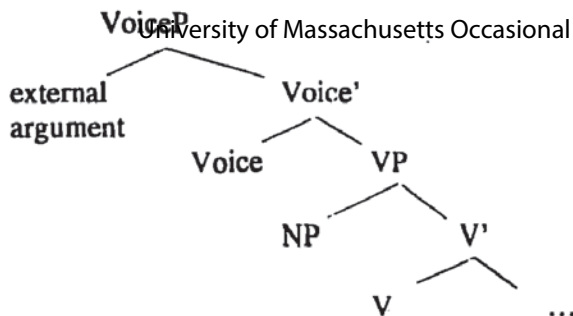 ∃e[bought(your slippers)(e) & Agent(we)(e) & in(Marrakesh)(e)]
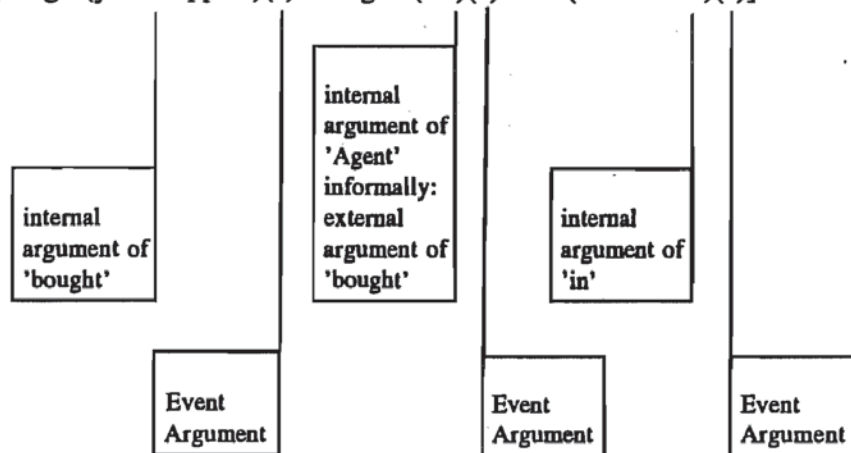
In Williams' theory, the external argument is simply a distinguished argument that is singled out by underlining. The main property of the external argument of a lexical item is that it has to be realized outside of the maximal projection of that item. This property must be stipulated since there is no necessary connection between underlining an argument and its having to be realized in a particular way. On the present proposal, we don't have to say anything special about the realization of external arguments. All we seem to need is a very general principle for the realization of all arguments (excluding the Event Argument, which doesn't ever seem to be syntactically realized). Here is a version of the principle (see e.g. Larson 1988).

(55)   **The Realization Principle**
        Arguments of a lexical item must be realized within the projection of that item.

The possible locations for arguments are now determined by the possible locations of the heads they are arguments of. If external arguments are arguments of Voice, and if Voice is a head right above VP, we get the following configuration:

(56)

VoiceP

```
                    VoiceP
                   /      \
          external        Voice'
          argument       /      \
                     Voice        VP
                              /        \
                            NP          V'
                                       /    \
                                      V      ...
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The fact that the external argument must be realized outside of VP follows from the Realization Principle and the fact that external arguments are introduced by inflectional heads.

Another peculiarity of external arguments is that they disappear under certain conditions, and they take accusative case with them when they go away. Why is that? Many answers have been given. One is to deny that external arguments and accusative case truly disappear. This is the basis for the analyses of passive in Jaeggli 1986, Roberts 1987, and Baker, Johnson and Roberts 1989. I think that these authors are right about the cases they discuss. Yet there are other cases where we have fully developed VPs without any evidence for the presence of even a hidden external argument. Of_{ing} gerunds are an example. Certain adjectival passive constructions are another example, as we will see in the next chapter. If external arguments were true arguments of their verbs or VPs, we would have to stipulate that they are suppressed under certain conditions (see e.g. Zubizarreta 1985, 1987, Grimshaw 1990, Grimshaw and Mester 1988). On the present approach, no such stipulation is necessary. If the external argument is introduced by an inflectional element that assigns accusative case, a bare VP without inflection is expected to have neither external argument nor accusative case. Again, no special statement has to be made about external arguments. This notion has become superfluous.

Where are we? I have made some beginning steps towards a theory of voice. The first move was to sever the external argument from its verb. The second move was to let the inflectional head that is responsible for accusative case introduce the external argument. I dubbed the head 'Voice' anticipating a connection with voice. The next chapter will gather more support for the present theory by examining adjectival passives.

References

Abney, S.P. (1987) *The English Noun Phrase in its Sentential Aspects*, Ph.D. thesis, MIT, Cambridge.

Bach, E.W. (1981) "On Time, Tense, and Aspect," in: P. Cole, ed., *Radical Pragmatics*, Academic Press, New York.

Baker, M. (1985) *Incorporation: A Theory of Grammatical Function Changing*, Ph.D. thesis, MIT, Cambridge.

Baker, M. (1985) "Syntactic Affixation and English Gerunds," Proceedings of WCCFL, UCLA, 1-11.

Baker, M. (1985) *Incorporation: A Theory of Grammatical Function Changing*, University of Chicago Press.

Baker, M., K. Johnson and I. Roberts (1989) "Passive Arguments Raised," *Linguistic Inquiry* 20, 219-252.

Belletti, A. and L. Rizzi (1988) "Psych-Verbs and Θ-Theory," *Natural Language and Linguistic Theory* 6, 291-352.

Benveniste, E. (1971) *Problems in General Linguistics*, Transl. Mary Elizabeth Meek, University of Miami Press, Coral Gables.

Bierwisch, M. (1983) "Semantische und konzeptuelle Repräsentation lexikalischer Einheiten," R. Ruzicka and W. Motsch, eds., *Untersuchungen zur Semantik* (Studia Grammatika 22), Akademie Verlag, Berlin, 61-99.

Bierwisch, M. (1989) "Event-Nominalizations. Proposals and Problems," *Linguistische Studien*, Reihe A 194, Akademie Verlag, Berlin, 1-73.

Bittner, M. (1992) *Crosslinguistic Semantics*, unpublished ms, Rutgers University.

Borer, H. (1984) "The Projection Principle and Rules of Morphology," *Proceedings of NELS* 14, UMass, Amherst, 16-33.

Borer, H. (1990) *Derived Nominals and the Causative-Inchoative Alternation: Two Case Studies in Parallel Morphology*, unpublished ms, University of California at Irvine.

Borer, H. (1990) "V+ing: It Walks Like an Adjective, It Talks Like an Adjective," *Linguistic Inquiry* 21, 95-103.

Bowers, J. (1990) *A Structural Theory of Predication*, unpublished ms, Cornell University.

Bowers, J. (1991) "The Syntax and Semantics of Nominals," *Proceedings of SALT* 1, 1-30.

Bresnan, J. (1982) "Control and Complementation," *Linguistic Inquiry* 13, 343-434.

Bresnan, J. (1982) "The Passive in Lexical Theory," in: J. Bresnan, ed., *The Mental Representation of Grammatical Relations*, MIT Press, Cambridge.

Brugmann, K and A. Thumb (1913) *Griechische Grammatik. Lautlehre, Stammbildungs - und Flexionslehre, Syntax*, Handbuch der klassischen Altertums-Wissenschaft. 4th edition, C.H. Beck'sche Verlagsbuchhandlung, München.

Castañeda, H.-N. (1967) "Comments of Donald Davidson's 'The logical form of action sentences'," in: Rescher, ed., *The Logic of Decision and Action*, 104-112.

Chomsky, N. (1991) "Some Notes on Economy of Derivation and Representation," in: R. Freidin, ed., *Principles and Parameters in Comparative Grammar*, MIT Press, Cambridge.

Chomsky, N. (1992) "A Minimalist Program for Linguistic Theory," *MIT Occasional Papers in Linguistics* 1.

Cresswell, M.J. (1973) *Logics and Languages*, Methuen, London.

Davidson, D. (1967) "The Logical Form of Action Sentences," In: N. Rescher, ed., *The Logic of Decision and Action*, University of Pittsburgh Press, Pittsburgh.

Dowty, D. (1989) "On the Semantic Content of the Notion of 'Thematic Role'," in: G. Chierchia, B.H.Partee and R. Turner, eds., *Properties, Types and Meaning*, Vol. II: Semantic Issues, Kluwer, Dordrecht.

Fanselow, G. (1984) "What is a Possible Complex Word?" in: J. Toman, ed., *Studies in German Grammar*, Foris, Dordrecht.

Fillmore, Ch.J. (1968) "The Case for Case," in: E. Bach and R. Harms, eds., *Universals in Linguistic Theory*, Holt, Rinehart and Winston, New York.

Grimshaw, J. (1990) *Argument Structure*, MIT Press, Cambridge.

Grimshaw, J. (1991) *Extended Projection*, unpublished ms, Brandeis University.

Grimshaw, J. and A. Mester (1988) "Light Verbs and θ-Marking," *Linguistic Inquiry* 19, 205-232.

Grimshaw, J. and E. Selkirk (1976) *Infinitival Noun Phrases in Italian*, unpublished ms, UMass, Amherst.

Gruber, J. (1965) *Studies in Lexical Relations*, Ph.D. thesis, MIT, Cambridge.

Hale, K. and S.J. Keyser (1987) "A View from the Middle," *Lexicon Project Working Papers* 10, Center for Cognitive Science, MIT.

Hale, K. and S.J. Keyser (1988) "Explaining and Constraining the English Middle," in C. Tenny, ed., *Studies in Generative Approaches to Aspect*, Lexicon Project Working Papers 24, Center for Cognitive Science, MIT.

Hale, K. and S.J. Keyser (1992) *On Argument Structure and the Lexical Expression of Syntactic Relations*, unpublished ms, MIT.

Hazout, I. (1990) *Verbal Nouns: Theta-Theoretic Studies in Hebrew and Arabic*, Ph.D. thesis. UMass, Amherst.

Heim, I. and A. Kratzer (1990-1993) *Introduction to Semantics*, unpublished lecture notes, MIT and UMass.

Higginbotham, J. (1985) "On Semantics," *Linguistic Inquiry* 16, 547-593.

Höhle, T.N. (1976) *Die Aktiv-Passiv Relation im Deutschen. Grundlagen einer lexikalistischen Syntaxtheorie*, Universität Köln.

Höhle, T.N. (1982) "Über Komposition und Derivation," *Zeitschrift für Sprachtwissenschaft* 1.1, 76-112.

Hung, H. (1988) *The Structure of Derived Nouns and Verbs in Malagasy: A Syntactic Account*, McGill University.

Jackendoff, R. (1977) *X' Syntax: A Study of Phrase Structure*, MIT Press, Cambridge.

Jackendoff, R. (1983) *Semantics and Cognition*, MIT Press, Cambridge.

Jackendoff, R. (1990) *Semantic Structures*, MIT Press, Cambridge.

Jaeggli, O. (1986) "Passive," *Linguistic Inquiry* 17, 587-622.

Jaeggli, O. and N. Hyams (1989) *On the Independence and Interdependence of Syntactic and Morphological Properties: English Aspectual come and go*, unpublished ms, UCLA.

Jespersen, O. (1961) *A Modern English Grammar on Historical Principles*, Part V. Syntax, Allen & Unwin, London (original edition: 1940).

Johnson, K. (1991) "Object Positions," *Natural Language and Linguistic Theory* 9, 577-636.

Joseph, B. and J.C. Smirnitopoulos (1993) "The Morphosyntax of the Modern Greek Verb as Morphology and not Syntax," *Linguistic Inquiry* 24, 388-398.

Klein, E. and I. Sag (1985) "Type Driven Translation," *Linguistics and Philosophy* 8, 163-201.

Larson, R.K. (1988) "On the Double Object Construction," *Linguistic Inquiry* 19, 335-391.

Lebeaux, D. (1986) "The Interpretation of Derived Nominals," CLS 22, 231-247.

Lewis, D. (1972) "General Semantics," in: D. Davidson and G. Hartman, eds., *Semantics of Natural Language*, Reidel, Dordrecht, 169-218.

Marantz, A. (1984) *On the Nature of Grammatical Relations*, MIT Press, Cambridge.

May, R. (1977) *The Grammar of Quantification*, Ph.D. thesis, MIT.

May, R. (1985) *Logical Form: Its Structure and Derivation*, MIT Press, Cambridge.

Mitchell, E. (1991) "Case and the Finnish Object," in: *Cornell Working Papers in Linguistics* 9, 193-228.

Montague, R. (1974) *Formal Philosophy*, Yale University Press, New Haven.

Parsons, T. (1985) "Underlying Events in the Logical Analysis of English," in: E. LePore and B. McLaughlin, eds., *Actions and Events: Perspectives on the Philosophy of Donald Davidson*, Blackwell, Oxford.

Parsons, T. (1990) *Events in the Semantics of English. A Study in Subatomic Semantics*, MIT Press, Cambridge.

Parsons, T. (1993) *Thematic Relations and Arguments*, unpublished ms, University of California at Irvine.

Pesetsky, D. (1989) *Language-particular Processes and the Earliness Principle*, unpublished ms, MIT.

Portner, P. (1992) *Situation Theory and the Semantics of Propositional Expressions*, Ph.D. thesis, UMass, Amherst.

Rappaport, M. and B. Levin (1986) "What to do with Theta Roles," *Lexicon Project Working Papers* 11, MIT.

Rivero, M.-L. (1990) "The Location of Non-Active Voice in Albanian and Modern Greek," *Linguistic Inquiry* 21, 135-146.

Roberts, I. (1987) *The Representation of Implicit and Dethematized Subjects*, Doris, Dordrecht.

Rullmann, H. forthcoming UMass Ph.D. thesis.

Schönfinkel, M. (1924) "Über die Bausteine der matematischen Logik," *Matematische Annalen* 92, 305-316.

Smith, C.S. (1991) *The Paramether of Aspect*, Studies in Linguistics and Philosophy, Kluwer, Dordrecht.

Speas, M. (1990) *Phrase Structure in Natural Language*, Kluwer, Dordrecht.

Stechow, A. von (1991) "Syntax und Semantik," in: A. von Stechow and D. Wunderlich, eds., *Semantik/Semantics. Ein internationales Handbuch der zeitgenössischen Forschung. An International Handbook of Contemporary Research*, de Gruyter, Berlin.

Williams, E. (1980) "Predication," *Linguistic Inquiry* 11, 203-238.

Williams, E. (1981) "Argument Structure and Morphology," *The Linguistic Review* 1, 81-114.

Williams, E. (1981) "On the Notions 'Lexically Related' and 'Head of a Word'," *Linguistic Inquiry* 12, 245-274.

Zubizarreta, M.L. (1985) "The Relation Between Morphophonology and Morphosyntax: The Case of Romance Causatives," *Linguistic Inquiry* 16, 247-289.

Zubizarreta, M.L. (1987) *Levels of Representation in the Lexicon and in the Syntax*, Foris, Dordrecht.

Zucchi, A. (1988) *The Language of Propositions and Events. Issues in the Syntax and Semantics of Nominalization*, Ph.D. thesis, UMass, Amherst.

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