On the projection of ditransitive verbs[*]

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1 Introduction

This paper deals with the problem of the projection of arguments, i.e., how the arguments of a predicate are integrated into a syntactic structure. My starting point is the model offered in Borer (1993). This model is defined by Borer as a 'syntactic predicate based account' of the projection of arguments.

In the next section I will briefly sketch the different approaches to the problem of argument projection, bringing some evidence from variable behaviour verbs[1] that motivates a predicate-based syntactic account. Borer's model is presented in the third section. Finally, I examine a case which was not dealt with in Borer (1993), that of ditransitives, and suggest some modifications to that model.

2 Approaches to the projection of arguments

2.0 The approaches to argument projection can be roughly divided into two kinds: **lexical-entry-driven** approaches and **predicate-based** approaches, the former taking as their basis the lexical entries of single verbs, and the latter - properties (especially aspectual ones) of the whole predicate, together with its arguments.

2.1 Lexical-entry-driven approaches

All lexical-entry-driven approaches share the assumption that lexical entries contain syntactic information that determines the syntactic level of D-structure. In other words, D-structure is deterministically and trivially projected from the lexical semantics. This assumption is shared by Baker's (1988) Uniformity of Theta Assignment Hypothesis (UTAH), Pesetsky's (1995) formulation of the Universal Alignment Hypothesis (UAH), Chomsky's (1986) Canonical Structure Realization

[*]I wish to thank Hagit Borer, Misi Brody and Rita Manzini for reading and commenting on an earlier draft. I also wish to thank the Ian Karten Charitable Trust for its financial support.

[1]Variable behaviour verbs are verbs that appear as both unaccusatives and unergatives.

(CSR), as well as by approaches which assume Lexical Conceptual Structure (e.g., Levin and Rappaport-Hovav 1995).

While the first three approaches (UTAH, UAH and CSR) assume direct projection from lexical semantics to D-structure, the latter one assumes some mapping from Lexical-Conceptual Structure (LCS) onto Predicate Argument Structure (PAS), which is then mapped into the level of D-Structure[2].

Variable behaviour verbs pose a problem to lexical-entry-driven approaches: as these verbs appear as both unergatives and unaccusatives, their unaccusativity/unergativity is neither fixed nor dependent upon their lexical entries. It is therefore not trivial to link the lexical semantics of these verbs with their syntax. In Italian and Dutch, variable behaviour verbs may take either 'be' or 'have' auxiliary. To quote one example of Italian 'run' (Borer 1993, quoted from Hoekstra and Mülder 1990):

(1) (a) Gianni ha corso (G. has run)
(b) Gianni e corso a casa (G. is run to home)

In Hebrew, some verbs, such as 'wilt' and 'disappear' may appear either with a dative possessor (henceforth PD, a dative argument that must be co-indexed with VP-internal material, hence indicating unaccusativity) as unaccusatives, or with reflexive dative (henceforth RD, a modal operator, giving the verb a volitional, atelic interpretation), as unergatives. The following example is also from Borer (1993):

(2) (a) ha-praxim navlu li
the flowers wilted to me
'My flowers wilted'

(b) ha-praxim navlu lahem
the flowers wilted to them
'The flowers were wilting'

(2a) is telic: the flowers have wilted completely. (2b), on the other hand, is atelic: the flowers are in the process of wilting, but may still be recovered if watered. Moreover, (2b), according to Borer, 'implies volition or at least self directed motion'.

[2]For the sake of brevity I ignore the details of this mapping; In Levin and Rappaport-Hovav's work there may be more than one level of lexical representation, with linking rules to map from level to level.

In dealing with variable behaviour verbs, Levin and Rappaport-Hovav suggest that such verbs have two entries in the lexicon, each correlating with specific syntactic properties (and syntactic structures), including unergativity and unaccusativity. That is, the syntactic structure in which the verb appears is a result of the information in the lexical entry concerning its unergativity or unaccusativity: if a verb such as 'wilt' appears with a dative possessor (hence telic) we know this is the unaccusative entry, and if it appears with a reflexive dative (hence atelic), then it must be the unergative entry. Note that the lexical entry, as assumed in this approach, determines the syntactic structure of the verb: if we chose, for example, the unaccusative 'wilt', then it can take a PD but not RD, and has a certain syntactic structure[3]. It could be, on the other hand, that syntactic structure could affect lexical meaning. The single lexical entry of such verbs is not fully specified for unaccusativity or unergativity, and it is the syntactic structure in which these verbs appear that determines whether they are unaccusative or unergative. This view is going to be defended in this article.

Assuming two distinct lexical entries for these verbs is necessary if we want to maintain a lexical-entry-driven approach, but such a step is undesirable. Not only does it not capture the generalization behind this class of verbs, but also, as Borer notes, according to such an approach two distinct lexical entries would be needed also for cases where verbs are associated with more than one aspectual meaning (examples taken from Borer(1993)):

(3) (a) I sprayed the wall with paint (=the wall completely painted)
(b) I sprayed paint on the wall (=the paint completely consumed)

(4) (a) I ate the cake (accomplishment)
(b) I ate at the cake (activity)

It turns out that deterministic mapping from lexical semantics to syntax would result in a substantial fragmentation of the lexicon, which is undesirable, at least from the point of view of language acquisition[4].

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[3]In fact, we have no way of knowing which of the two meanings was selected unless the verb appears in some syntactic structure that is associated with this meaning (e.g., PD or RD in Hebrew), and deducing from the syntactic structure which lexical entry was chosen is begging the question, in my opinion.

[4]The syntactic lexical-entry-driven approaches (UTAH, UAH and CSR) do not refer to this issue specifically, but since they all depend on theta-roles (UTAH and CSR) or other 'roles' as mediators between lexical semantics and syntax, I can't see how they escape the multiple lexical entry solution, assuming different theta roles for each meaning.

2.2 Predicate-based approaches

The main motivation for a predicate-based approach is the observation that the meaning of verbs does not depend solely on their 'lexical' meaning, but can be influenced by their arguments. Several examples for this are:

(i) Specific objects vs. non specific ones can make the verb telic or atelic:

(5) (a) John ate spaghetti (atelic, activity)
(b) John ate a bowl of/ the spaghetti (telic, accomplishment)

(ii) Some PP *arguments* can turn an atelic (and unergative) verb into a telic (and unaccusative) one:

(6) (a) John ran (in the park) (atelic, activity, unergative)
(b) John ran to school (telic, accomplishment, unaccusative)

(iii) A direct object vs. oblique argument can make the verb telic or atelic:

(7) (a) John ate the cake (telic, accomplishment)
(b) John ate at the cake (atelic, activity)

It has been noted (see Van Valin (1990), Dowty (1991)) that the unaccusative/unergative diagnostics correlate with semantic and aspectual properties: unaccusativity is associated with non-agentive, telic characteristics, whereas unergativity is associated with agentive, atelic ones. This correlation is stated in Dowty (1991):

Agentive, Atelic: definitely unergative
Non-Agentive, Telic: definitely unaccusative

Van Valin (1990) argues (in Borer's words) 'that the unaccusative/unergative diagnostics is altogether *not* a syntactic one, but rather, an aspectual/semantic one, driven not by the information in a particular lexical entry concerning the projection of its arguments, but rather, by the properties of the entire predicate, of which the meaning of the verb is just one part.'

According to Van Valin (1990), there is no need for distinct syntax for unaccusatives and unergatives: both have the same syntactic representation, with distinct semantics, according to the aspectual properties of the predicates those verbs

form. The verb 'eat', for example, in Van Valin's view, is an activity verb. A lexical rule will derive the telic 'eat' (as in (4b)) from the atelic one (4a)[5].

Let us call this approach a predicate based, non-syntactic approach.

However, there is some evidence for the existence of distinct syntactic representations of unaccusatives and unergatives. This evidence comes from the distribution of possessor dative in Hebrew, and auxiliary selection of light-verb construction in Dutch.

Possessor datives in Hebrew may bind any (traditional) VP-internal material, arguments and adjuncts alike. The only excluded bound element is the 'external' argument (examples are from Borer 1993):

(8) ha-mitriya nafla li al ha-Svil leyad ha-mitbax
the umbrella fell to me on the path next to the kitchen
'My umbrella fell on the path, next to the kitchen'
'The umbrella fell on my path, next to the kitchen'
'The umbrella fell on the path, next to my kitchen'

(9) ha-yeladim zarku li et ha-kadur le-tox ha-gina al yad ha-mitbax
the boys threw to me acc the ball into the garden next to the kitchen
*My boys threw the ball into the garden next to the kitchen
'The boys threw my ball into the garden next to the kitchen'
'The boys threw the ball into my garden next to my kitchen'
'The boys threw the ball into the garden next to my kitchen'

As noted by Borer, the adjuncts in (8)-(9) do not contribute anything to the aspectual properties of the predicate. It is therefore difficult to explain the relation between the dative possessor and the adjuncts on semantic grounds. On the other hand, a syntactic account, assuming different positions for the arguments of unaccusatives and unergatives, can explain the difference between (8) and (9).

As for Auxiliary selection in Dutch, the following data, taken from Everaert (1992), is presented by Borer:

(10) (a) Het vleigtuig *is* geland
the plane is landed

[5]This lexical rule (which is based on conceptual structure, and is not going to be cited here) enables us, according to Van Valin, to avoid listing those verbs twice in the lexicon.

(b) De voorstelling *is* aangevangen
the performance is begun

(11) (a) Het vleigtuig *heeft* een landing gemaakt
the plane has a landing made

(b) De voorstelling *heeft* een aanvang genomen
the performance has a beginning taken

As noted by Everaert, (10a) and (11a) are synonymous and have the same aspectual properties (both being telic). The same holds for (10b) and (11b). It seems that in this case auxiliary selection is not sensitive to semantic properties such as telicity or agentivity, but rather to the presence of a syntactic NP, which is not an argument, but part of a complex predicate. Again, a purely semantic approach is not likely to be able to account for these facts.

On the basis of the above data, a syntactic predicate-based account is suggested by Borer, in which semantic (aspectual) properties of the predicate are taken into consideration, interacting with syntactic aspectual projections.

3 A syntactic predicate-based approach

Within the model suggested in Borer (1993), the VP has no internal hierarchical structure, and arguments are not specified as internal or external. A lexical entry, it is assumed, specifies only the existence of one or more arguments (one for intransitives, two for transitives, etc.), which are not ordered. Hierarchical structure is achieved through movement of arguments to the specifier of some functional projection, for the sake of Case assignment. Case assignment in those projections is optional, but it is assumed that nominative Case assignment is obligatory, and is assigned at the specifier of TP. Two aspectual projections are introduced: **AspEM** (for Event Measurer), that gives the event encoded by the verb a telic interpretation (if its specifier hosts one of the arguments), and **AspOR** (for Originator), that gives the event an agentive, atelic reading, and whose specifier generally hosts the subject of a state predicate, or an agent.

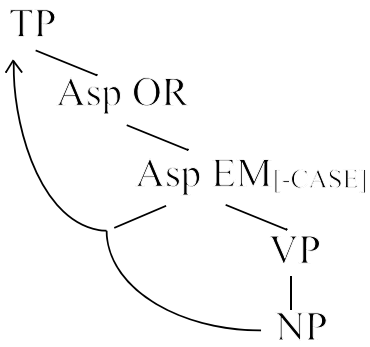
AspEM shares some features with AgrO, in that it may assign accusative Case. The argument that lands at the specifier of that node serves as the **measurer** of the event, a notion taken from Tenny (1987,1992). The measurer is the argument that goes

through some change of state or motion, and serves as a scale on which the event may be seen as proceeding[6].

It is argued by Tenny that if the event is measured out by some argument, then this argument is the direct object of the verb. Often, as in the case of simple transitive verbs, the measurer also delimits (=gives an endpoint that is encoded linguistically) the event[7].

The difference between unaccusatives and unergatives may now be regarded as a syntactic one. (12) is the derivation associated with unaccusatives, whereas (13) is that associated with unergatives.

(12)



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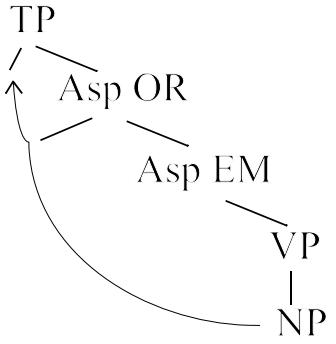


[6]Take, for example, the case of 'John ate the apple': the apple is the measurer of the event, in that in indicates at what point the event stands: is it whole, half-consumed, two-thirds consumed, etc. No other argument can give that indication (we can't judge concerning the proceeding of the event by looking at John, for example).

[7]Again, take the 'John ate the apple' case: the event encoded by 'eat' terminates once the measure argument, the apple, is consumed (=has gone completely through the change of state that is entailed by the meaning of the verb).

Note that in (12) AspEM cannot assign case, which results in the argument raising to TP for case. However, it still has the aspectual interpretation associated with AspEM, having passed at its specifier. The specifier of AspOR is not projected, hence no agentive, atelic interpretation arises. In (13), on the other hand, the Specifier of AspEM is not projected. The single argument of the verb is assigned Case at TP, passing on its way at the specifier of AspOR. In (12), a telic reading is activated, and in (13) - an agentive atelic one, thus capturing the semantic effects of the unaccusative/unergative distinction within syntax.

Variable behaviour verbs may undergo either of the two derivations (12) and (13). The derivation of a simple transitive verb involves the raising of two arguments to two case positions. The argument that lands at AspEM turns out to be the measurer of the event.

However, to account for cases like (14):

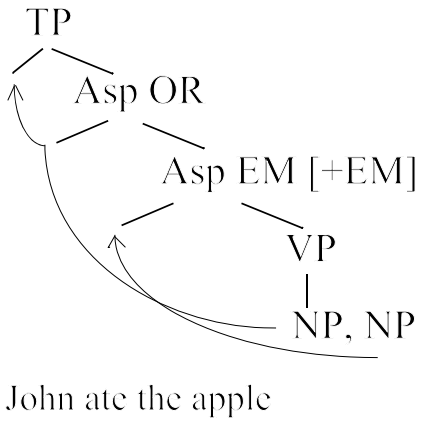
(14) Kelly knows the answer

in which the direct argument is not the measurer of the event, the following **Conditions on Aspectual Realization** (CAR) are introduced:

A. If AspEM is specified then AspP is [+EM]
B. If AspEM is specified it must be fully realized (i.e. it must have a filled specifier).
C. Every proposition must have (at least) one fully specified aspectual node.

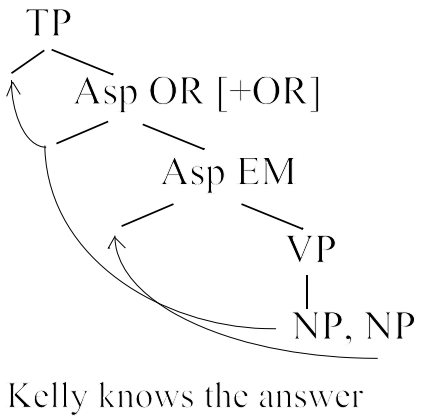
AspEM may now be unspecified, thus serving as a Case assigning projection without yielding any aspectual meaning, as in (14). (In that case AspOR has to be specified). In the case of telic predicates, unaccusatives and simple transitives, it is specified:

(15)



John ate the apple

(16)



This is, in a nutshell, Borer's (1993) model for the projection of arguments. I leave aside her analysis of definite and indefinite arguments, and go further on, to see how this model works for ditransitives.

4 Two comments

4.0 Before I go on to ditransitives, two points of clarification are called for:

4.1 Telicity revisited

So far it is assumed that only the number of arguments required by the verb is determined when the verb is selected.

Clearly, this is not enough: as things stand now, all intransitives are ambiguous between an unaccusative and an unergative reading, which is certainly not the case: we have to ensure that 'arrive' has only an unaccusative interpretation, whereas 'work' has only an unergative one. In addition, we have to provide a telic interpretation for 'John ate the cake' and an atelic one for 'Kelly knows the answer'.

I therefore suggest that the part of the lexical entry of the verb which is 'visible' to syntax contains, in addition to the number of arguments, information about telicity: whether the event described by the verb is telic or atelic. 'Telic' amounts to having a [+EM] node, whereas atelic amounts to a non specified EM node. Unaccusatives, which are telic, must have a [+EM] node, otherwise the derivation is ruled out. Unergatives must not have a [+EM] node, and variable behaviour verbs may have either.

Examples of 'input' provided to syntax by lexical entries are:

(i) arrive: [NP], telic
(ii) work: [NP], atelic
(iii) wilt: [NP]
(iv) eat: [NP, NP], telic[8]

Note that this does not mean that variable behaviour verbs have two lexical entries: they are listed only once in the lexicon, and have one core meaning (e.g., 'become limp or droop' for 'wilt'). They are not specified as telic or atelic: the syntactic structure in which they appear determines their precise meaning and their aspectual properties (and not vice versa, as in the lexical entry driven approach).

4.2 Thematic roles

As there is no hierarchy of arguments within the VP, no traditional theta-roles (e.g. agent, patient, goal, etc.) are assigned in it. In Borer (1993) it is assumed that 'labels akin to ACTOR and UNDERGOER (from Van Valin's 1990 terminology) or PROTO AGENT/PROTO PATIENT (Dowty 1991) are possibly associated with such arguments', but 'such association is part of LF, where the semantics of a compositional predicate is constructed on the basis of the syntactic structure as well as the basic meaning of the verb'.

A detailed discussion of the nature of thematic roles is beyond the scope of this paper, but here are some speculations about the way in which they can be integrated into our model:

I accept Dowty's (1991) claim that, for the purpose of argument selection, two Proto-Roles - Proto-Agent and Proto-Patient - are sufficient. Each of these roles is characterized by a set of properties that a group of predicates entails with respect to one of the arguments of each. P-Agent properties are, among others, volition, causing an event and sentience, and P-Patient properties are, among others, change of state, being an incremental theme, being causally affected.

I also adopt Brody's (1993) view, that LF is the only level of representation. Furthermore, in the next section I will show that adopting such approach enables us to account for the projection of ditransitives without violating the shortest link requirement on chains.

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[8]I discuss only definites in this paper, ignoring indefinites, which, as I showed before, may influence the aspectual properties of the predicate. Some verbs are inherently atelic (e.g. 'know'), no matter whether their arguments are definite or not.

Putting these two assumptions together, I suggest that thematic Proto-Roles are assigned (to the extent that they are indeed assigned by the predicate) in the aspectual projections: roughly, in active forms, Proto-Agent is assigned AspOR and Proto-Patient in AspEM. In more precise terms, properties of Proto-Roles are entailed by predicates not with respect to single arguments (because they are unordered and bear no labels) but with respect to argument positions: the verb 'murder', for example, entails, by virtue of its lexical meaning, that its subject (or the argument that has passed through AspOR) performs a volitional act and that it causes an event, and that its object has gone through some change of state and is causally affected by another participant. Suppose we project the verb 'eat', with its two arguments 'Mary' and 'the apple' in such a way that 'Mary' lands at AspEM and 'the apple' - at AspOR. The only interpretation that can be assigned to the sentence 'The apple ate Mary' is, that there exists some apple that can eat humans, and it ate Mary. We may rule out this sentence on pragmatic grounds, as there are no such apples in our world, although this sentence is syntactically well-formed. However, note that 'the apple' has, under the interpretation given to this sentence, some properties which characterize Proto-Agents, such as volition and causing an event. 'Mary', on the other hand, has some of the characteristics of a Proto-Patient: she undergoes change of state, serves as an incremental theme (being consumed) and is causally affected by another participant. It therefore seems plausible to me that P-Roles are assigned in the aspectual projections, to whatever argument that happens to land in their specifier.

5 Projection of ditransitives

I now turn to ditransitives, or verbs that are traditionally characterized as having two internal arguments.

Most of these verbs are 'give'-type verbs, as in (17a-b):

(17) (a) John gave Bill a book.
(b) John gave a book to Bill.

Some, however, are cases of double accusatives:

(18) John taught Bill French.

The main problem that these verbs pose is, how are such structures derived? The aspectual nodes that were introduced so far do not seem able to assign case to all three arguments in (17a), although all three need case.

Before addressing this problem, I would like to note a significant fact about ditransitives: unlike the case of simple transitives, the argument that is their measurer does not delimit the event they describe. To give an example: in both (17a) and (17b) the direct object, 'a book', is the measurer of the event. It is the direct object that goes through some change and motion, and it indicates the stage at which the event stands, say, by indicating the location of the book relatively to its final goal. However, it is the NP 'Bill', in (17a) or the PP 'to Bill' in (17b) that delimits the event described by the verb, because the act of giving terminates (and this is defined linguistically) when Bill has received the book[9].

The same holds for (18): 'French' is the measurer, indicating how much of it was taught, but it is 'Bill' that delimits the event, when he has learned 'all' the French[10].

Having noticed this, we can return to the derivations of (17a-b) and (18). The case of (17b) is simpler - the PP serves as a delimiting phrase. It remains in the VP, and I assume, following Borer (1993), that 'whatever stays in the VP incorporates semantically (and at times syntactically as well)'. Semantic incorporation 'in this case[11] amounts to entering the PP argument as a DELIMITER into the interpretation of the AspP subpredicate'.

The nature of semantic incorporation is somewhat obscure, and is not going to be investigated here. Anyway, the verb now has a telic (delimited) interpretation, given by the PP.

The derivation of (17b) is as follows:

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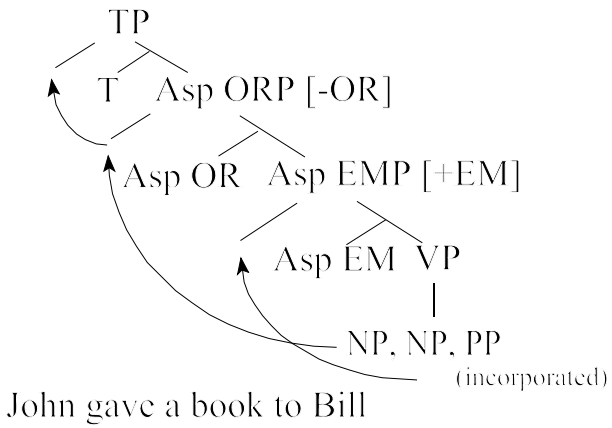
[9]Indeed, when 'give' is used without its delimiter argument, the result is awkward, unless the action can be viewed as habitual, or an activity: We (always) give gifts on Christmas.

[10]Tenny (1987) notes that oblique arguments may delimit the event described by the verb in case the measure does not specify the event's endpoint. It is claimed that in the case of double object verbs the dative object must delimit the event (see p.227 ff).

[11]Borer deals with argument PPs in predicates such as 'run to the store'. I do not see a reason why the case of ditransitives should be different.

(19)

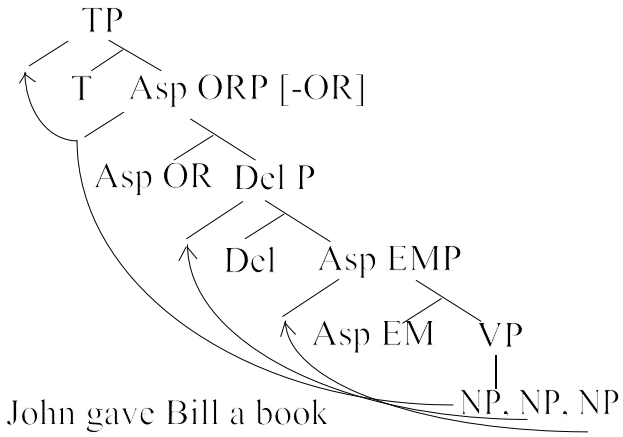


AspOR is not specified, so the atelic interpretation cannot be achieved. The 'subject' ends up at SpecTP, the 'object' - at the specifier of AspEMP, being assigned the interpretation of a measurer. The PP incorporates into the VP, serving as the delimiter of the AspEM subpredicate[12].

In the cases of (17a) and (18), there are three NPs. Since NPs do not incorporate (at least in English, which is the case in point), they must land in the specifier of some functional projection.

TP and AspEMP host already two arguments. I suggest that the third one ends up at the specifier of **DelP** (for Delimiter), and is thus assigned both case and the interpretation of the delimiter:

(20)



[12]Note that in Borer (1993) the [+EM] specification means that the argument in the specifier of AspEM is both a measurer and a delimiter. I will come back to this later.

Verbs such as 'give' may undergo either of the derivations (19) or (20). However, (20) is incompatible with the current theory of locality, as formulated in Chomsky (1992): a minimal domain cannot range over more than two specifiers, thus avoiding raising from within the VP to AspOR. Theories suggesting a functional projection for the dative argument of the double object construction (Koizumi 1993, Landau 1994) have assumed VP-shells, in which the subjects are generated in the upper VP, whereas the two internal arguments, including some of the functional projections that assign them case, are generated in the lower one. This, of course, is incompatible with a non hierarchical VP. I therefore assume that the arguments of the verb are base-generated in the specifier of some functional projection. Just as we assumed so far that each argument may raise to any of the specifiers available, thus each argument may now be generated in any specifier, keeping the non-deterministic projection. The verb is adjoined to AspOR, forming a chain with the positions through which it passed. The subject appears at the specifier of TP, co-indexed with its trace at AspOR. The other arguments remain in their base positions, so no crossing chains occur. No derivation takes place: The above representation takes place at LF, which, following Brody (1993) I consider the only level of representation. In fact, a theory in which the arguments of the verb are base-generated in their Case positions is the only way to keep the non hierarchical VP hypothesis without violating economy (namely, the shortest link requirement). This problem only arises in cases where the verb has more than two arguments.

The same economy considerations have led Koizumi (1993) to abandon the Internal Subject Hypothesis, and argue for the Split VP Hypothesis (hence SVPH), according to which the subject is base generated in a higher VP, above AgrO and the projection to which the dative argument raises. According to him, the SVPH, along with the requirement for shortest chain links (Chomsky 1992), explains why the number of internal arguments is limited to maximally two. In my model, there could theoretically exist more than two 'internal' arguments, but I will show this is not the case, because of semantic considerations rather than theory-internal ones.

A few words are needed to argue for the new aspectual projection I introduced, DelP. The idea that the dative argument of double object constructions raises to the specifier of some functional projection has already been suggested before (Landau (1994) and Koizumi (1993); their suggested projections are called AGRd and omegaP respectively).

My purpose in calling that projection 'delimiter phrase' is to emphasize its aspectual role: this projection is only licensed in case there is a delimiter in addition to the measurer of the event (otherwise it is not filled and the syntactic representation is ruled out). Not surprisingly, the verbs that allow three NP arguments are exactly those

that have both a measurer and a delimiter[13]. A second internal argument is allowed only when it has an aspectual role, i.e., delimiting. A third internal argument is therefore impossible. All the aspectual projections in this model have semantic (aspectual) contents, so there is no worry that a large, non restricted set of functional categories would arise. There can be no more aspectual projections (or more internal arguments), as there are no more aspectual roles.

One could ask why aspectual projections should be preferred to simple AgrS, AgrO and AgrD projections. Indeed, instead of the [+/-OR/EM] specifications we could have had AgrO which is [+/-EM], etc. The answer is that aspectual properties are assumed here to be of great importance in mediating between the semantics of the predicate and its syntactic structure, and therefore I regard these functional projections primarily as aspectual ones, rather than as agreement projections that may also have some aspectual properties.

I now return to the question that arised before, concerning cases in which the measurer of the event is not its delimiter.

I assume that [+EM] means both a measurer and a delimiter, unless there is a separate delimiter (either an NP or a PP), which then takes up the delimiter role. If AspEM has both the measurer and the delimiter roles, in spite of the presence of another delimiter, the sentence would then be ruled out: from a semantic (or pragmatic) point of view, it would be impossible to give such a sentence a coherent interpretation (recall 'Mary ate John the hamburger', cited in the last footnote). from a syntactic point of view, such a sentence is bound to have a redundant argument, because I have shown above that a second internal argument is allowed only when there is no other argument that delimits the event. This could be viewed as an 'aspectual criterion', stating that each aspectual role should be saturated by one argument. I leave open the question whether each argument must also be assigned an aspectual role[14].

Finally, I would like to address the following question: what part of the lexical entry of the verb is accessible to syntax?

I started by assuming that it is only the number of the arguments. I then added also the specification [telic/atelic] (or the specification of the AspEM node), as this proved necessary.

Let us see if this is sufficient for generating well formed sentences:

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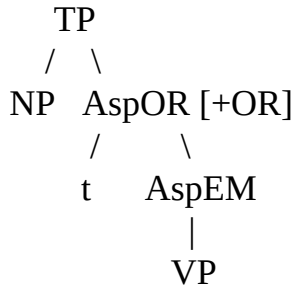
[13]If we introduce a delimiter NP to a verb that is already delimited by its direct argument, the sentence fails to achieve a coherent interpretation:

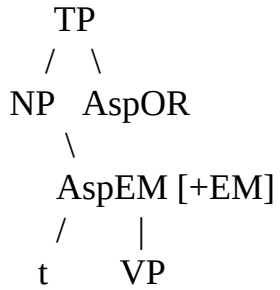
?Mary ate John the hamburger

[14]This question mainly touches upon subjects of transitives and unergatives, as well as direct objects which are not measures.

Case I: lexical input: (A) NP, [atelic]
(B) NP, [telic]

The only possible syntactic representation is (21) for (A) and (22) for (B):

(21)


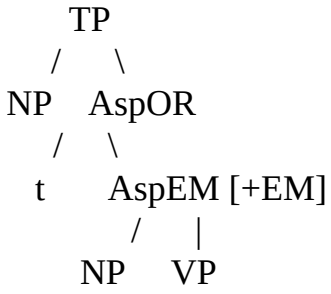
(22)


In the case of (B), AspEM must be specified, but still caseless. The argument forms a chain with its trace at AspEM. It may be the case that AspOR is not projected when not specified, as it is not needed for case assignment. However, there may be some independent need for it to be projected (e.g., assignment of the Proto-Agent role), and I leave this aside, assuming it is projected.

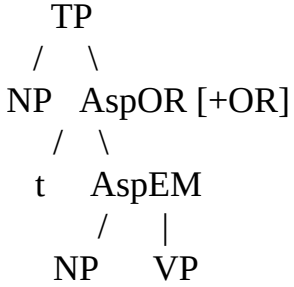
Case II: lexical input: (A) NP, NP [telic]
(B) NP, NP [atelic]

In the (A) case (see 23), AspEM has to be specified, as well as a case assigner (otherwise a case position for one of the arguments will be missing). In (B) (see 24), it is not specified:

(23)

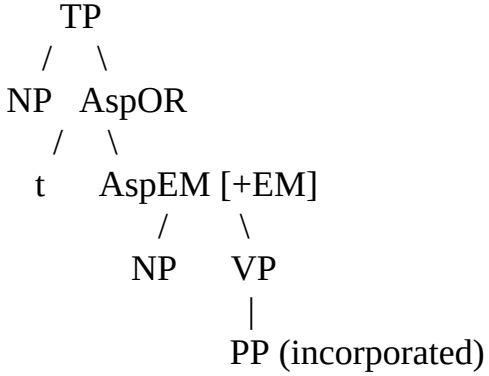


(24)



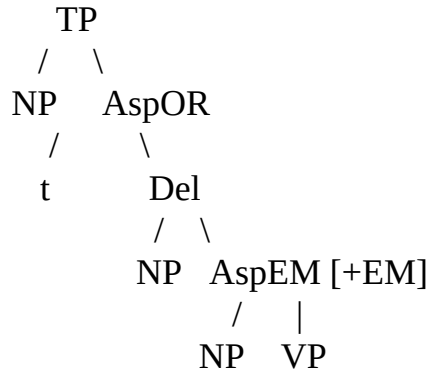
Case III: lexical input: (A) NP, NP, PP [telic]
(B) NP, NP, NP [telic][15]

(25)



[15]Note that three place predicates cannot be atelic: if there are three NPs, one must be assigned case at the specifier of DelP, thus delimiting the event. If the third argument is a PP, then, as an argument PP it is incorporated into the verb as a delimiter. This also holds in the case of 'I put the book on the shelf'.

(26)



It turns out that determining the number of arguments the predicate has, in addition to the information whether the predicate and its arguments form a telic or atelic event, is sufficient to compute syntactically well-formed sentences[16]. The [telic/atelic] specification has to do mainly with the status of the (traditionally called) direct object, or the argument that is generated in AspEM: it indicates whether the direct object goes through some change (hence measures out the event) and whether it delimits the event described by the verb. In case the event is telic, the 'direct object' must also delimit the event where there are two arguments, and must not do so in case there are three[17].

If we have one argument which forms a telic event with the predicate, we know the predicate is unaccusative.

The information about telicity is semantic, and purely aspectual. When it interacts with syntactic information, such as the number (and kind) of the arguments of the predicate, it can produce a syntactic representation for the projection of the arguments of that predicate.

[16]Tenny's (1987) Aspectual Interface Hypothesis (AIH) states that 'only the aspectual part of cognitive structure is visible to the syntax'. While owing much to the AIH, my account differs in that it also allows categorial information to be accessible to syntax, and in determining what aspectual properties (i.e. telicity) are visible by the syntax.

[17]See above: when there are three arguments, the measure role and the delimiter role are taken up by different arguments. In no other case are three arguments allowed.

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