Argument structure of verbs

1. The definition of 'argument' and the concept of 'argument structure'.

The term `argument' (argomento) is reserved for those syntactic elements whose presence in the clause (usually referential elements such as NPs and PPs) can be attributed to the specific requirements of some other syntactic element (a predicate such as a the verb). Thus in a clause of the type:

1a. Tom handed the books to Jane

the three syntactic elements *Tom* (NP), *the books* (NP) and *to Jane* (PP) are considered to be present because required or selected by the verb *hand*. They are said to be `arguments' of this verb. In this respect they differ from any of the italicised elements added in the following extended versions of the original sentence:

2a. *At his mother's request,* Tom handed the books to Jane
2b. *Just before dinner* Tom handed the books to Jane
2c. Tom *finally* handed the books to Jane
2d. Tom handed the books to Jane, *for return to the library*

Indeed, we can have a perfectly well-formed sentences in which all these elements are present:

2e. *At his mother's request, just before dinner* Tom *finally* handed the books to Jane, *for return to the library*

The different status of the italicised elements is shown by the fact that they are entirely optional from the syntactic point of view - indeed the original (1a) was perfectly well-formed without them. By contrast none of the elements that accompany the verb in (1a) can be omitted:

1b. *Tom handed the books
1c. *Tom handed to Jane
1d. *Tom handed

Significantly, if we change the verb in a sentence such as (3a) following and depending on the verb we choose as a replacement, we may be obliged to change some of the non-italicised elements:

3a. *At his mother's request, just before dinner* Tom *finally* handed the books to Jane.
3b. *At his mother's request, just before dinner* Tom *finally* obtained the books from Jane.
3c. *At his mother's request, just before dinner* Tom *finally* dusted the books.

Thus we observe that the choice of the verb *obtain* necessitates a change in the PP (the P *to* is replaced by *for*), while the choice of *dust* means that no PP is required. By contrast, none of the other elements - the italicised ones - need undergo any change as a result of the change of verb. It is clear then that there is a difference in syntactic status between the two sets of elements: the non-italicised elements display a closer dependence on the verb than the other elements. Their presence may be obligatory or else excluded, depending on which verb is chosen. The other elements are unaffected by the choice of the verb. We may define the status of the former series of elements by saying that they are `selected' by the verb. The italicised elements are not selected. The term `argument' is reserved for elements selected by the verb (or by some other predicate with similar properties of selection), while the other elements may be referred to as `non-arguments'. The argument/non-argument distinction, then, concerns the status of a given element in relation to some predicate with selection properties (in terms of syntactic functions the non-arguments in our examples would be considered `adverbials').

It is important to understand that `selected element', which we have used to define argument status, should not be confused with `obligatory element'. It so happens that in our original example (1a) all the selected elements are also obligatory in the sense that the omission of any of them produces an ungrammatical structure (as is shown by (1b) - (1d)). But this is not the case with all selected elements (or arguments, as we are calling them). Indeed, it is sufficient to observe that the following altered version of (3b) is perfectly acceptable:

3b'. *At his mother's request, just before dinner* Tom *finally* obtained the books

Here the argument PP *from Jane* has been omitted, without causing any ungrammaticality. Nevertheless, we will classify the PP in question as an argument of the verb *obtain*, i.e. as an element which, when present, is present as an element required - or selected - by the verb *obtain*. We will give a very simple justification for this. Let us compare our examples with the verb *obtain* with the following, which also contain a verb followed by a PP headed by *from (as well as another PP)*:

4a. Tom was speaking to his friends from the balcony

4b. Tom was speaking to his friends

Once again, we notice that the PP in question can be omitted without giving rise to an ungrammatical structure. Is there any difference, then, between this case and (3b')? The answer is that there is: the *from* PP in (3b) is much more closely connected with the verb *obtain* than is the corresponding PP in (4a). In the end this has to do with the lexical semantics of *obtain*. What this verb in fact means is something like `entity *x* effects a transfer of some other entity *y* from a third entity *z* (in favour of the first entity *x*)'. In other words the semantic contribution of a *from* PP (in a sentence constructed around the verb *obtain*) is not simply to furnish an extra bit of information about the event (as would be the case with *in the corridor* or *outside the pub*); rather the content furnished by the PP is intrinsic to the verb *obtain* - it is `presupposed' or focused by that verb[1]. Clearly, the same cannot be said for corresponding element in the case of *speak* - the lexical semantics of this verb in no way focus the locative source of the speaking. This content is no more intrinsic to the verb *speak* than the information provided by a PP such as *during the football match* or *in front of the town hall*. The acid test of the claim we are making is that in (3b), where the *from* PP has been omitted, we nevertheless understand that a `source' must be involved, whereas in (4) the fact that Tom is speaking to his friends from a place different from the one where they are standing is in no way suggested if the *from* PP is omitted, as it is in (4b)[2]. Arguments, then, remain somehow implicit even when they are not realised in the syntax; non-arguments do not, or only do so to a very weak extent[3].

Notice that the term ‘argument’ covers both VP-internal elements (the NP *the books*

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[1] Another way of putting this would be to say that *z*, the source of the transferred entity *y*, is an integral part of the `lexical conceptual structure' associated with the v *obtain*. For this term, see below.

[2] It might of course be clear from the extralinguistic context or from the preceding text. But that it a different matter. The point is that it is in no way suggested by sentence (4b).

[3] Thus it is somehow implicit, for any event, that there is a location in which it takes place and a time at which it takes place (or is predicted to take place). But this is true for all events and is therefore not *specifically presupposed* by any of them.

and the PP to *Jane* in (1a)) and VP-external elements (the subject NP *Tom*). The term `argument' is therefore not a synonym of `complement', since the latter term comprises only VP-internal elements. Thus in our example only *the books* and *to Jane* are `complements' of the verb, while the subject NP *Tom* is an argument but not a complement. Stated in this way, however, this simple distinction is in danger of concealing the fact that the two terms argument and complement actually belong to different levels. The status of argument relates to a pre-syntactic level: saying that a verb *x* has three arguments is equivalent to saying that it has a syntactic potential to be accompanied by three elements; the exact syntactic status that these elements will assume - in terms of where they are realised in the structure (inside or outside VP) and what formal categories they turn out as (NP, PP, S etc) - is a matter of the concrete realisation they are given. Thus an element like *the books* in (1a) is present in order to realise part of the syntactic potential of the V *hand* - this can be conveyed by saying that it as an `argument' of that verb but it also realised a specific configurational relation with that verb (as a sister in the containing node V') - this is conveyed by saying that it is a `complement' of the verb (in the specific instance a special type of complement known as the object).

2. From Conceptual Structure to Argument Structure

As was mentioned above, when we say that a given verb `projects three arguments' we are describing the syntactic potential inherent in its conceptual structure (i.e. in its semantics). We assume in fact that each verb is associated (in our mental lexicon) with a conceptual structure (Lexical Conceptual Structure or LCS), which basically specifies the 'concept' that is associated with that verb. Thus a verb such as *hand* will have an LCS in which the concept of 'handling' is defined and the number of participating entities specified:
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LCS - *hand* (verb)
Concept: 'transfer an object from one person to another (by use of hand)'
Participating entities: 3

This conceptual structure then forms the basis for deriving the 'argument structure' (struttura argomentale). In its simplest form the argument structure of the verb *hand* may be represented as follows:

Argument Structure - *hand* (verb)
Arguments: x, y, z
Thematic roles: x = Agent
y = Patient
z = Recipient

where *x*, *y* & *z* represent the three arguments. The thematic role to be attributed to each of the arguments depends on how the corresponding participant is understood to be involved in the event corresponding to the concept associated with the verb. It is generally assumed that there will be some degree of asymmetry in this, that one entity will be somehow 'responsible for the event' (i.e. instigator or doer or Agent) and that another entity will be 'affected by the event' (i.e. undergoer or Patient). We will return to the question of how the thematic roles are

identified and computed in the following section. Notice that in this basic form the argument structure of a verb contains no information regarding the formal categories that realise the arguments in question. It is not a specification in terms of NPs, PPs etc. Indeed, the whole point of argument structure is that it is situated *at one remove* from the concrete syntactic realisation: in the syntax each of the arguments will have to take the concrete form of an NP or a PP (or possibly some other category) but the argument structure does not directly furnish information about this; rather it constitutes the most basic sort of specification of the *syntactic potential* of a given lexical element. As such, it is a sort of 'bridge' between the conceptual structure and the syntax. Indeed, what are needed, in order to go from the argument structure of a given verb to the syntactic structure that this verb is actually associated with are general `linking' rules, i.e. rules which specify for a given argument - with a given thematic role - how it will be realised in the syntax (by what type of element and in what position).We may represent this hierarchy of levels in the lexical entry as follows:

LCS - *hand* (verb)
Concept: 'transfer an object.....another (by use of hand)'
Participating entities: 3

Argument Structure - *hand* (verb)
Arguments: x, y, z
Thematic roles: x = Agent
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z = Recipient

Syntactic realisation - *hand* (verb)
x (= Agent) - NP (Subject)
y (= Patient) - NP (Object)
z (= Recipient)- PP (*to*)

The idea that argument structure should *not* include detailed information about the formal realisation of the arguments of the verb - whether they spell out as NPs or PPs or whatever - has its basis in the overall aims of syntactic theory, that of providing an account of the syntax of natural languages that is consistent with the knowledge of language structure that a native speaker can plausibly be assumed to have and also with the fact that languages have to be acquired by very young children. Now the native speaker of English (or of any other language) has a mental lexicon that allows him/her to construct any number of syntactically well-formed sentences around any number - one is actually talking of thousands and thousands - of different verbs.

The point we are trying to make is that the knowledge that a native speaker has of the verbal lexicon must be systematic and cannot plausibly be piecemeal. In other words, it is simply not plausible to imagine that for each individual verb in his lexicon - or more properly for each distinct *sense* of each verb (more on this later: see the section on *email* below) - the

native speaker has memorised the exact complementation structure - in terms of NPs, PPs, APs etc and the relative linear order of realisation - that it requires. Rather we have to assume that, given an idea of the lexical conceptual structure of a verb, the native speaker will know, on the basis of certain general principles governing the mapping from the LCS to the syntax, which syntactic structures are possible and which not. In its strongest form this hypothesis claims that in our mental lexicon the `entry' for each verb is accompanied by the minimum information relating to its LCS and its argument structure, and *not* by a whole range of detailed information about the syntactic structures that accompany it. What we are claiming is that native speakers of English do not have - and indeed do not need a syntactically explicit lexical entry for the verb *hand* like the one that follows:

hand (verb) _ NP (Subject) [V NP (Object) PP(*to*)][4]

i.e. a lexical entry which, in addition to telling us that the verb in question is followed by 3 arguments (*x, y, z*) and what thematic roles are associated with these arguments, also specifies that argument x (Agent) is realised as an NP in subject position, argument y (Patient) as an NP adjacent to the verb in VP, and argument z (Recipient) as a PP based around the P *to* occupying a position in VP to the right of the NP realising argument y. What we are saying, then, is that the greater part of this information is redundant.

To illustrate what we mean by this detailed information about syntactic realisation being redundant, we will concentrate on one very banal (and superficial) point: it is clear that a native speaker of English knows that whenever a verb is followed by two arguments (NP and PP), the linear order will be V NP PP, not *V PP NP (except in cases of superficial re-arrangement known as Heavy-NP Shift). It seems reasonable to assume that the native speaker knows this as a matter of general principle, and that it is therefore not necessary for the mental lexicon to replicate this information for each individual verb. In the discussion that follows we will begin to concentrate on the question of what might replace the sort of detailed lexical information that we have just rejected.

A further way in which the detailed syntactic information might be seen as redundant is if we consider that each thematic role has a standard syntactic realisation (in the way for instance that the Agent - outside superficial rearrangements of the clause such as passivisation - is always realised as NP Subject). If it is the case that all the other thematic roles - whatever they might be - turn out to have fixed syntactic realisations as the Agent arguably does, then we will be able to eliminate the syntactic realisation level of the lexical entry completely: once one has specified the thematic roles, the rest will follow on the basis of the standard realisations of these roles. The problem with this is a very simple one: even assuming that the

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[4] This sort of detailed syntactic representation of the syntactic structure of a verb is known in the linguistic literature as the `subcategorisation frame' of the verb in question. The idea is that verbs can be subcategorised on the basis of the syntactic structures they require. Since (in English at least) all verbs are accompanied by a subject, the differentiation is limited to what accompanies it in VP, i.e. it is limited to its complement structure. Indeed, in most analyses that use the term, 'subcategorisation' includes a specification only of the elements that follow the verb in VP (its complements). The Subject argument (sometimes called the 'external argument') is excluded. As we will be at pains to show, the simple fact that a given verb `subcategorises' an NP does not allow us to predict very much about its syntactic behaviour. See the discussion of the verb *e-mail* below.

thematic roles are clear (in the sense that one can simply 'read them off' on the basis of the LCS of the verb), it is far from being obvious that each of them has a single clear syntactic realisation. Indeed, a much more sophisticated idea of what thematic roles might be is needed if we are to see anything but chaos in this crucial area of the 'mapping' or 'linking' between roles and syntactic realisations. This problem will be illustrated in the detailed discussion of the verb *load* below.

3. Argument structure and the syntactically relevant denominators of verb meaning

In this section we will concentrate on the problem of how the argument structure of a verb is derived from the LCS (Lexical Conceptual Structure) and we will illustrate the concept of thematic role (as set out above). We will start by showing how thematic roles can be considered to be the 'common denominators' in verb meaning, i.e. those semantic components present in large numbers of verbs, irrespective of their different meanings, which constitute the basis for their similar syntactic behaviour. We will begin by considering the following sentences:

1. a. Tom polished the table
   b. Tom chopped the wood
   c. Tom ironed the shirt
   d. Tom mixed the ingredients
   e. Tom painted the lamppost
   f. Tom repaired the bike
   g. Tom folded the sheets

we find that each of the verbs is accompanied by two NPs and that these two NPs represent 'participants' in the action (or event) denoted by the verb. Beyond this, we might observe that in each case the referent of the NP on the immediate left of the verb is understood as participating actively in the event (or as instigating it in some way), while the referent of the NP on the immediate right of the verb is understood as participating passively (i.e. as undergoing the action rather than instigating it). In the examples in (1) this understanding of how the entities denoted by the two NPs participate in the action is reinforced by the fact that the preverbal NP denotes an animate (indeed human) entity - in other words a typical active participant - and the postverbal NP denotes an inanimate entity (these typically undergo actions rather than performing them)[5]. What appears to be the case, then, is that the sentences in (1), despite the obvious fact that each contains a different verb, display considerable similarity of meaning: although polishing is (radically) different from chopping, which is different from ironing or painting or folding or mixing, each of the sentences yields an interpretation that is similar to that of the others at least as regards the question of how the participating entities engage in the action. Pushing our observations a stage further, we might begin to hypothesise - on the basis of the fact that the entity understood as participating actively is always represented by an NP in preverbal position, while the entity understood as participating passively is always represented by an NP in postverbal position - that the similarity of interpretation which we have just detected in all the sentences in (1) has syntactic

[5] It is easy to show, however, that the degree of animacy is not necessarily the determining factor. Thus in a sentence such as *The falling tree hit Tom* (where both participating entities are [+ animate] and the one represented by the NP on the right of the verb is [+ human]), the interpretative pattern observed in (1) remains.

consequences. In other words, we might advance a hypothesis - in line with what was sketched out in the preceding section - to the effect that for any verb *x*, such that *x* is accompanied by two NPs (or arguments) associated respectively with an interpretation as actively participating entity (Agent) and passively participating entity (Patient), the former will be realised in preverbal position (i.e. as grammatical subject) and the latter will be realised in postverbal position (i.e. as grammatical object)[6].

What this (apparently banal) conclusion amounts to is a claim that within the overall meaning of a verb (be it *mix* or *polish* or *fold*) there are syntactically relevant aspects of the meaning - and consequently also that there are syntactically *irrelevant* - or not immediately relevant - aspects. Put slightly differently, the conceptualised event corresponding to the verb *fold* is such as to include two participating entities, one characterised by active participation and the other by passive participation, and it is this part of its meaning - rather than what is specific as it were to the verb *fold* and what therefore differentiates it from *chop* or *slice* - that determines its syntactic behaviour.

Thus, on this view, the common denominator in the conceptual structures of the verbs listed above is this fact that each of them involves the same number of participating entities and attributes to each of these one of two distinct ways of participating in the event, either as active instigator (Agent) or as passive undergoer (Patient). Notice that identifying these participating roles as the chief common denominators in the meanings of the verbs listed above - and by implication of a considerable proportion of the verbs in the language - is tantamount to recognising participant roles as having the key function in mediating between verb meaning and syntactic realisation. On this view participant roles (or 'thematic roles/θ roles' as we will call them from now on) have a role as *primitives* of the theory. It is thematic roles that are understood to give linguistic structuring to our concepts of events, turning them into argument specifications (or argument structures) that form the basis of a syntactic realisation. It is perhaps worth adding that thematic roles represent a very unidirectional idea of how the interface between the verbal lexicon and extralinguistic reality functions: on this view we have event concepts stored (in the mental lexicon) together with labels for these event concepts (our verbs). The concepts are fixed, and deriving the argument structure is simply a matter of identifying the θ roles within the event concept. This is thought to be a simple matter of reading them off on the basis of simple definitions such as 'entity most directly affected by the verbal action' (for the patient θ role) etc. In other words the direction is exactly as represented in the preceding section, *from* conceptual structure *to* argument structure:

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[6] Seen from this point of view, it is surely not a chance matter that there is no verb in English which reverses the mapping between the two interpretations of the participating entities and the two syntactic arguments. In other words, there can be no verb *throp* such that in *Tom thropped the dog* we understand that `Tom' underwent the effects of the `thropping' event and `the dog' instigated this event; if the verb *throp* existed, a sentence like the one given would have to mean that `Tom' instigated the event of thropping and `the dog' underwent it. Note that this amounts to a claim that in English - and by extension in other natural languages - there are limits on what is a `possible verb': a verb like *throp* (in the example given and with the interpretation with `Tom' as undergoer) is simply impossible, it cannot exist. If it is the case that certain types of verb are impossible (while others are possible), it follows that native speakers (who occasionally invent new verbs) must `know' the principles which determine what is a possible verb and what isn't. We will illustrate this point more fully below (see discussion of the recently introduced verb *e-mail*).

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LCS - *hand* (verb)

Concept: 'transfer an object.....another (by use of hand)'

Linguistic structuring (argument structure)

Arguments: x, y, z

Thematic roles: x = Agent
y = Patient
z = Recipient

The idea that there might be a (bidirectional) interaction between the linguistic form and the conceptual level is simply not entertained. Thus the idea of the syntax-semantics interface based on thematic roles tends to rule out a view in which the arrow between the conceptual level and the level of linguistic structuring of this is bidirectional:

LCS - Concept ('handing')

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Linguistic structuring (argument structure)

Notice that an argument structure of the type discussed above(based on specification of the number and type of thematic roles required by a given verb) is by no means useless: it allows us to formulate a straightforward account of what has happened in the following sentences:

3a. The table was polished
3b. The wood was chopped
3c. The shirt was ironed
3d. The ingredients were mixed
3e. The lamppost was painted
3f. The bike was repaired
3g. The sheets were folded

In each of the (passive) sentences in (3), there has been some change in the way the argument structure of the verb has mapped onto the syntax. In particular, the agent argument is not realised in the syntax at all, while the patient argument is realised as syntactic subject (instead of appearing in object position). Notice that the account of passivisation that is implicit in this is formulated in terms of arguments (and is independent of the lexical content of the individual verbs). We could formulate it as follows: for any verb, if it projects two arguments (corresponding to agent and patient θ roles), then the passive structure is formed by `disactivating' the agent argument syntactically and promoting the patient argument to subject position.

To close this section, we will elaborate a little on one of the basic problems that arises with thematic roles: given the meaning of a verb (the event concept it is associated with) it must be possible to establish what the thematic roles are with a reasonable degree of certainty. If it is not, then the essential instrument in computing the interface between the verbal lexicon and extralinguistic reality will turn out to be useless.

We will discuss this problem in relation to the thematic role of `patient'. A definition frequently given of this role is that it corresponds to the entity most directly affected by the action represented by the verb' (this is also implicit in the term undergoer). This definition is clear enough to distinguish between the roles of the two NPs in the following sentence:

1a. The boys burnt the books

Indeed, it is clear that `the boys' cannot be thought of in any way as `affected by the verbal action' (indeed it is them that set it in motion), whereas this would be a perfectly apt description of the way `the books' participate in the event. It is also clear that in the following:

1b. The boys looked at the books

`the books' is something less than an affected entity (in no sense does the event of `looking at' a book mean that the book is affected). We would thus not wish to say that in this case `the books' is a patient, and we would be comforted by the fact that its syntactic realisation (as a PP) is different from what we had in (1a), where it was realised as an NP adjacent to the V in VP (the normal realisation of the patient role). But what are we to say of the following?

1c. Tom taught the boys the craft of bookbinding

Which is the entity most closely affected by the verbal action in this case? On purely intuitive criteria (and this is all we have to go on) it might be `the boys' or `the craft of bookbinding'. Both these entities are in some sense affected by the action: `the craft of bookbinding' is affected by the action in the sense of being the entity that is transmitted in the action of teaching (there is no teaching without something being taught); `the boys' are affected in the sense that if anything is affected by what happens it is them: at the end of the process they have in some sense been changed (having acquired knowledge that they did not previously have). The problem, then, is that our definition does not give us any firm basis for deciding between these two answers to the question. Of course one might notice that sentence (1c) is in fact in correspondence with another syntactic type that can be used to represent exactly the same event:

1d. Tom taught the craft of bookbinding to the boys

If one had concluded that `the boys' were the patient in (1c), this reformulation of the sentence might make one change one's mind: indeed, the formal realisation of this argument is now PP, instead of NP. This would be a non-standard realisation of the role of patient (which we are assuming is canonically realised as the direct object NP). We might then revert to the idea that `the craft of bookbinding' is the patient: this would not only give us a consistent account of both sentences, it would also allow us to retain our idea that the patient role always has the same formal realisation. The crucial point, of course, is that we are no longer identifying the thematic roles on the basis of verb meaning and predicting the syntactic realisation of the arguments on the basis of the thematic roles. Instead our procedure has become entirely circular: we are looking at the syntactic realisaton in order to establish the thematic role, which was supposed to be the basis for predicting the syntactic realisation! Suffice it to say that similar, if not more serious, problems arise with the identification of the Agent role on the basis of a simple definition such as ‘active participant’ or ‘instigator of the event’. We will return to this problem of identifying thematic roles at various points below. Our basic position will be that simple notional definitions such as the ones that we have been working with so far

will never prove a satisfactory basis for defining thematic roles. Instead, as we will see, thematic roles need to be grounded in event structure, but, at that point they cease to be primitives and are seen as derivable from something else.

4. The limits of θ roles: analysis of 'Locative Alternation' verbs (*load*)

As a first example of how the conceptual structure of a verb provides the basis for deriving the syntactic structure or structures that it is allowed to appear in, we will consider the verb *load*, the prime representative of a class of verbs (present in many languages) known for systematically allowing two different syntactic realisations of their arguments (these are often referred to as `alternations' and the verbs that allow them are sometimes called `argument alternation verbs'). Our aim in conducting this investigation is to show that the interaction between conceptual structure (LCS in our representations above) and argument structure is complex (rather than straightforward) and that the 'concept' associated with a given verb at LCS may be creatively elaborated at the level of argument structure, so as to derive two different (and more specific) conceptualisations from a single global 'concept'. In the course of the discussion a certain amount of light will also be thrown on the thematic role of Patient (and thematic roles generally). We will consider whether these can be defined in easily understood every-day terms such as 'the entity most directly affected by the action associated with the verb' or whether their definition will not have to be couched in some other terms. This problem will be taken up more fully in a further section below.

The alternations in question are exemplified for English *load* and its Italian equivalent *caricare*:

3a. Tom loaded the cart with hay
3b. Tom loaded the hay onto the cart
4a. Gianni ha caricato il carro di fieno
4b. Gianni ha caricato il fieno sul carro

It is clear that conceptually `loading' involves something which is loaded (sometimes called a 'locatum') and somewhere where it ends up (a 'locatio' or location). This is true of any act of loading (there can be no act of loading without something being put somewhere - even a computer is said to `load' software and programmes etc onto its hard disk). At first sight, then, there is every reason to think that the thematic roles are the same in both the (a) and the (b) realisations in (3) and (4). In either realisation, the cart is where the hay ends up (the 'locatio') and the hay is the entity that undergoes the change of location (the 'locatum'). One obvious possibility is simply to take over these names 'locatum' and 'locatio' and use them directly as thematic roles. Alternatively, one might ask whether one of these participants might not be assimilated to one of the classic thematic roles, for instance that of patient. This would have the advantage of not creating a new set of roles (locatum & locatio) and allowing the greatest possible scope to the existing ones. The problem of course is which of the two arguments should be understood as Patient (we are assuming that only one of them may be). And here the answer is anything but straightforward, and this provides a good illustration of one of the principal problems with the concept of thematic roles. Assuming that the patient role should be attributed to 'the most directly affected entity' (a frequently heard definition), we have the problem of deciding whether this is the `the hay' or `the cart'. Both are in some way directly affected: the cart changes state by becoming loaded or filled and the hay changes location by being moved onto the cart. Both change of state and change of location are typically associated with the Patient role. So there is a problem of deciding between two equally convincing candidates for the role of patient.

But there is a further problem. If we assume that each of the participants ('the hay' & 'the cart') have the same thematic role in each of the two realisations, then we have to allow that for each role there are two different syntactic realisations. If we assume that 'the cart' is Patient, then we have to recognise that there are two possible realisations of this role, one exemplified in (3a), where it takes the form of an NP, and one in (3b), where it takes the form of a PP. Similarly, if we assume that 'the hay' is Patient, we find a PP realisation in (3a) and an NP realisation in (3b). In (5a) following we illustrate this situation: we give two representations of the lexical entry of *load*: the first corresponds to the hypothesis in which 'the hay' is Patient and the second to the hypothesis in which 'the cart' is Patient (these are meant to be alternatives - remember that we have no obvious way of deciding between them). In each case the non-Patient argument is described simply as 'other internal argument' (we do no take up any position on what theta role should be posited for this). For each hypothesis regarding the assignment of the role of Patient two different syntactic realisations are shown, the first (marked as XP^a) is the one found in realisation (3a) above and the second (marked XP^b) is the one found in realisation (3b):

5a. **"load" _ x [y, z]** (i) Patient = *the hay*
x (agent/external arg.) = NP
y (patient/internal arg.) = PP^a (*with*) or NP^b
z (other internal arg.) = NP^a or PP^b (*onto*)
where: XP^a = formal realisation of the argument in the first syntactic structure [= (3a)]
XP^b = formal realisation of the argument in the second syntactic structure [= (3b)]

"load" _ x [y, z] (i) Patient = *the cart*
x (agent/external arg.) = NP
y (patient/internal arg.) = NP^a or PP^b (*onto*)
z (other internal arg.) =PP^a (*with*) or NP^b
where: XP^a = formal realisation of the argument in the first syntactic structure [= (3a)]
XP^b = formal realisation of the argument in the second syntactic structure [= (3b)]

In addition, in each case one of the realisations is distinctly unusual: thus it is unusual for a locative goal to be realised as an NP (compare *Tom walked onto the platform*); and it is unusual for a patient to be realised as a PP introduced by *with* (compare *Tom destroyed the documents/*with the documents*).

On the basis of the account we have just given of the examples in (3), then, it seems that we have to accept the idea that the same theta role can systematically have *more than one formal realisation* (in an initial structure, before any movement rules apply). This is of course unwelcome from a theoretical standpoint: our aim in positing the existence of theta roles was to identify those aspects of verb meaning that have a *systematic effect* on syntactic realisation (or that lie behind the various subcategories of verbs defined on the basis of similar syntactic behaviour). If we have to accept that for each theta role (and especially for central theta roles such as Patient) highly divergent formal realisations are possible then the whole idea of theta roles risks becoming vacuous. It would no longer constitute any basis for *predicting* the syntactic behaviour of a verb on the basis of its meaning. At that point the notion of theta roles

would cease to make any contribution to explaining how such an implausibly large amount of apparently detailed information about the syntactic behaviour of thousands of different verbs can be accommodated in the mental lexicon of each native speaker. This unwelcome conclusion suggests that we should re-examine the examples just given and see if some other analysis might not suggest itself.

A more careful examination of the examples in (3) will reveal an interesting difference in interpretation that so far has escaped us. Let us imagine that we wish to verify that the events encoded in the two sentences, (3a) and (3b), have actually taken place. Which of the entities involved in the event - `Tom', `the cart', or `the hay' - would we look at first? It seems reasonable to think that we would verify sentence (3a) by looking at the cart and seeing whether it was full, and sentence (3b) by looking at the hay and seeing whether it had all been loaded onto the cart (in neither case would our first instinct be to look at Tom!). With (3a) the sentence would remain true even if a certain amount of hay was left over; similarly, (3b) would be judged true if the hay was all used up but a part of the cart was still empty. But why should this be so? The answer is that in sentence (3a) we are dealing with a conceptualisation of `loading' in terms of its effects on the cart, while in sentence (3b) we are dealing with a conceptualisation of the same basic action in terms of its effects on the hay. Put simply, in (3a) we are talking about `loading the cart' (effect on the cart) and in (3b) we are talking about `loading the hay' (effect on the hay). From the syntactic point of view, then, in each case it is the entity realised as Object that establishes the particular construal (or conceptualisation) of the loading process that we have in each case.

Notice that this is not simply a question of triggering one or other of two 'construals' of loading: there is in fact a more technical point underlying our question above about which entity one would look at first in order to establish the truth of the two sentences. In either construal ('effect on the hay' or 'effect on the cart') `loading' is a process that can be thought of as eventually reaching a completion point (at which point all the hay has been transferred or the whole cart has been filled, depending on the chosen conceptualisation) but, equally importantly, it proceeds towards this completion point *incrementally*: as the action proceeds, the hay or the space on the cart (again depending on the conceptualisation chosen) is gradually used up or exhausted. Once again it is the entity realised as Object that is understood to 'measures out' the event in this way. In (3a) this is the cart; in (3b) it is the hay. What we are claiming, then, is that (3a) represents a choice in which the event is conceptualised in terms of the cart not just in some vague way ('effect on the cart') but rather in the precise sense that it is the cart that `measures out' the event: the more of the cart that has been filled, the more the process of loading (according to this construal) has proceeded towards its culmination point. The same is true, *mutatis mutandis*, for (3b): here it is the hay that measures out the event in this precise sense (the more hay that has been transferred to the cart, the nearer the event is to its culmination).

It is very important to understand that all this is a matter of how the event is *conceptualised* linguistically as working; it is not necessarily a reflection of reality. Indeed, in the real world the exhaustion of *either* the space on the cart *or* the quantity of hay will necessarily bring the action of loading to an end (loading cannot go on if there is nothing more to load or no more space to load it into).But, from the narrow point of view of the permitted linguistic construals of loading, it seems that *we are simply not allowed to conceptualise the event as depending on both the entities in question at the same time* (the space available on the cart and the amount of hay remaining) but rather *we have to make a choice.* In other words we are obliged to take one of these two entities (the cart, the hay) and give it a special status as

the entity that in our chosen conceptualisation 'delimits' or 'measures out' the event (syntactically this means realising it as NP Object). Linguistically loading cannot be construed as an event in which both these entities *together* delimit or measure out the event. We must choose.

Thus the two conceptualisations or construals of `load' involve two different ways of structuring the event in terms of its duration (more precisely, its incremental progression) and eventual culmination. In each case it is the argument realised as the Object NP - the direct internal argument - which triggers this conceptualisation. What we see then is that some principle of event conceptualisation - basically a linguistic principle - is imposed on us and 'structures' reality for us. We are not allowed to represent reality as it is; rather we must make a choice between two possibilities that the permitted linguistic structuring of reality presents us with.

A further point needs to be made on the basis of what has emerged from our discussion of *load*. We have spoken of two (linguistically determined) construals or conceptualisations of 'loading'. Now we started out with an idea of the conceptual structure or LCS of a verb determining the argument structure (and so the syntactic realisation). On this view a verb is associated with a given concept (an everyday idea of what the verb means) and this determines a certain array of arguments which are specified at the level of argument structure. These different arguments are differentiated by labels (thematic roles) such as Agent, Patient, Recipient etc. These roles are computed by considering how the participant entities engage in the event (actively? passively? etc). We now see that this is a gross simplification. First of all, the the conceptualisations (of 'loading') that are pertinent for the definition of the argument structure *are themselves elaborations of the basic concept.* Thus we have in our heads a basic idea of what 'loading' is (the transfer of some sort of material to some sort of (mobile) container) but, before we can use it linguistically, we must refine this concept by elaborating it in one of two possible ways ('loading measured out in terms of the material' or 'loading measured out in terms of the space occupied in the container'). Crucially these further elaborations of the basic concept involve something more than just thematic roles (in the strict sense of stereotypical ways in which a participating entity is understood to be involved in the event, seen in terms of a greater or lesser degree of active participation): in fact what we are appealing to (whichever of the two elaborations we choose) is an aspectual or 'actional' notion. Basically the function of 'measuring out the event' is part of a larger actional/aspectual structure associated with the verb *load*. What this means is that the concept 'load' is associated with a type of event that is not just a process or activity (like 'talking' or 'dancing' for instance) but an activity that inherently leads to a culmination point (the point at which the cart is full or the hay all transferred). In other words, it is a complex event, with more than one internal phase or 'subevent' (a process phase and a culmination phase): we can represent this as follows. Abstract event structures of this type are known as 'accomplishments'. We can represent this as follows:

'ACCOMPLISHMENT'

Subevent 1	+	Subevent 2
Process		Culmination

'Accomplishments' thus contrast with homogeneous (i.e. non-complex) events such as 'singing', 'walking' or 'pushing the pram': these have no culmination phase and are known as

'activities'. Instead of trying to formulate the lexical requirements of *load* in terms of thematic roles, it might make more sense to assume that the most important thing about it is that it has to be accompanied by an 'accomplishment' type of abstract event structure. We can then note the peculiarity of this verb (and others that behave in the same way): that it allows *either* of its internal arguments to have the crucial aspectual function of 'measuring out the event' (compare the verb *pour*). That the argument chosen for this function then receives a syntactic realisation as Object NP will follow from a general principle to the effect that within an accomplishment structure this function is performed by the Object NP. In other words, abstracting away from the specific point about *load* (viz. that it allows either of its internal arguments to be given this function), we can assume that the syntactic realisation is the result of the accomplishment actional structure, not of a given array of thematic roles. What we see opening out here is a different vision of the interface between the lexicon and syntax, one in which the 'primitives' are types of actional structures, not thematic roles. Verbs are mapped onto the syntax via association with actional structures (activity, accomplishment, achievement - see below). Thematic roles, if they exist at all in the traditional sense, are in some way epiphenomenal: they are (more or less) convenient labels for what are in fact actional/aspectual functions of the arguments in question. Below we will present a more fully developed idea of how this idea might be implemented.

5. Actionality and the verb *e-mail.*

Our aim in this section will be to show the variety of different structures that can be derived from the verb *email* and advance some sort of hypothesis as to what is behind them. What we will try to show is that verbs, though clearly understood on an intuitive level to denote certain clearly defined types of event or action, are frequently compatible with a variety of different conceptualisations of that event or action. Thus everyone knows intuitively what 'e-mailing' is but there is nevertheless *no single fixed way of using this verb syntactically*. Rather, as we will see, there are various different specific ways of conceptualising the action of 'e-mailing' and each of these has different consequences on the syntactic level. Each of these specific conceptualisations of 'e-mailing' is compatible with our intuitive general idea of what 'e-mailing' is (in no case would we say "This is not e-mailing - it is something else"). But each of them involves some different abstract way of structuring the event. What is meant by this will (it is hoped) become clearer in the course of the exposition.

We will start from the assumption that the verb *e-mail* can be construed as a two-argument ('diadic') or three-argument (' triadic') predicate (valency specification of this type is the central feature of the lexical entry of a verb and represents the minimum information about its syntactic use). The native speaker knows that the following are all possible:

1a. Tom e-mailed the document

1b. Tom e-mailed the document to his friends

These can be thought of as standard syntactic realisations where *e-mail* appears with two and three arguments respectively. Indeed, (1a) might be thought of as a version of (1b) in which one of the arguments has been omitted. The two arguments (apart from the one realised in Subject position) correspond to the entity transmitted and the entity that receives it (we will avoid using the standard thematic role labels for these participants for reasons that will become clear later). In addition to these possibilities, the native speaker knows that *e-mail* allows the so-called `double object' structure:

1c. Tom e-mailed his friends the document

In this case the NP PP sequence following the verb in (1b) is replaced by an NP NP sequence and the order of the arguments is reversed (the argument corresponding to the entity that receives the transmitted entity now precedes the argument corresponding to the entity transmitted instead of following it as it did in (1b)).

On the basis of the three structures we have seen so far, one might be tempted to suggest that the native speaker's knowledge of the verb *e-mail* is modelled on the verb *mail* or *send*. Indeed, both these verbs allow all the above structures:

3a. Tom mailed the document
3b. Tom mailed the document to his friends
3c. Tom mailed his friends the document
4a. Tom sent the document
4b. Tom sent the document to his friends
4c. Tom sent his friends the document

We will begin the discussion by comparing *e-mail* and *send*, leaving the comparison of *e-mail* and *mail* till later.

That there is a semantic similarity between the two verbs, *e-mail* and *send,* is obvious (e-mailing after all is a specialised form of sending messages). The fact of the matter, however, is that certain things are possible with *e-mail* that are not possible with *send*. For instance, *e-mail* but not *send* can be used intransitively (without an object NP):

5a. Tom has been e-mailing all afternoon
5b. *Tom has been sending all afternoon

Furthermore, *e-mail* can be used with a single argument corresponding to the entity that receives the transmitted entity (this argument will normally have a [+ human] feature); *send* does not allow this structure:

6a. Tom has e-mailed all his friends
6b. *Tom has sent all his friends (* ungrammatical in the intended interpretation[7])

Optionally, the third argument of *e-mail*, corresponding to the entity transmitted, can be realised as a PP introduced by *with*:

6a'. Tom has e-mailed all his friends with the details
6b'. *Tom has sent all his friends with the details

Again, this structure is not possible with *send*. Indeed, it recalls *present* rather than *send*:

6c. Tom presented all his friends with the details[8]

One way of accounting for the observed fact that *e-mail* reproduces all the structures of *send* and the structure of *present* would be that it allows its general lexical content ('transmission of information by electronic means') to be construed in two more specific ways. Thus we can have a conceptualisation similar to that of 'sending' and another similar to that of 'presenting'; one might characterise the former as a construal in terms of a direct effect on the entity

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[7] [1] This structure is of course perfectly acceptable under the interpretation where Tom's friends are the entities that undergo the action of sending rather than those that receive some transmitted entity. For instance: *There is a demonstration tomorrow outside the Houses of Parliament and John is sending all his friends*.

[8] [2]Notice that the equivalence with *present* is not complete: the equivalent of (6b) would in fact not be grammatical in the appropriate interpretation: **Tom presented his friends*. A more appropriate verb would be *serve*, which allows both *Tom served his guests with coffee* and *Tom served his guests*.

transmitted and the latter as a construal in terms of a direct effect on the entity that receives.

This dual conceptualisation attaching to *e-mail* can be seen at work in another set of examples, this time involving the *-ing* nominalisation of the verb. Here we see that with *e-mail* both the transmitted entity and the entity that receives can be realised syntactically as a postmodifying PP following the N *e-mailing*:

7a. [the e-mailing of the documents] took all afternoon

7b. [the e-mailing of the clients] took all afternoon[9]

As we would expect in view of (6b) above, the equivalent of (7b) is ungrammatical with the nominalisation of the verb *send*:

8a. [the sending of the documents] took all afternoon

8b. *[the sending of the clients] took all afternoon

Thus we will conclude that (7a) instantiates *e-mail* in its *send*-like construal, while (7b) instantiates it in its *present*-like construal.

But the story does not finish here. When we noticed apropos of (6a') that it resembled the structure that accompanies *present*, we skipped over the fact that this latter verb is not exactly like *e-mail* in that it does not allow the equivalent of (6a), where the second argument is omitted:

6a. Tom e-mailed his friends

6d. *Tom presented all his friends (* in appropriate interpretation)

We may now connect these facts with another use of *e-mail* that we noticed in passing:

5a. Tom has been e-mailing all morning

This too is quite unrepresented among the possibilities with *present* (again in the appropriate interpretation):

6e. *Tom has been presenting all morning

The two uses exemplified by (6a) and (5a)) suggest, then, that in establishing that *e-mail* can be associated with the event conceptualisations normally associated with *send* and *present* we have by no means exhausted the possibilities of this verb. Indeed, both (6a) and (5a) recall the uses of verbs such as *telephone*:

9a. Tom telephoned all his friends

9b. Tom has been telephoning all morning

The parallel with this verb is further confirmed by the fact that the interpretation given to (5a) is restricted in exactly the same way as that given to (9b). In order to see this we will consider for a moment what exactly is understood on the basis of the latter sentence. In English the verb *telephone* means something like 'contact by telephone' and not 'speak on the telephone with', an interpretation that cognate verbs can easily give in other languages. It follows from this that sentences such as *Tom telephoned their office all morning* can only mean that during the course of the morning he made repeated attempts to contact their office by telephone; it cannot mean that he spent the entire morning engaged in a single protracted conversation with the office in question. The same is true of (9b): this sentence is normally understood to refer to a series of phone calls that filled the morning (not to a single call). Exactly the same interpretation arises with (5a): Tom is understood to have filled the morning with a series of events of e-mailing (not with one extended event). Given this strong parallelism between *e-mail* and *telephone*, we will claim that there is a third conceptualisation of 'e-mailing', and

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[9] [3] Here the interpretation intended is that the clients were the recipients of the e-mails in question. Another interpretation is possible in which the clients are agents of the e-mailing. Neither interpretation is possible in the equivalent structure with *send*.

that this can be glossed as 'contact by e-mail'. Like the conceptualisation associated with *present* and associated with *e-mail* as in (6a'), this is an 'effect' on the entity that receives. However, it is arguably a different construal from that one for the simple reason that (as we noticed above) with *present* and many verbs like it the acceptability of the structure is dependent on the presence of the *with* PP[10]. Sentence (6a), by contrast, is perfectly acceptable without any PP.

We will now compare *e-mail* with *mail*:

10a. Tom mailed the documents
10b. Tom mailed the documents to his friends
10c. Tom mailed his friends the documents
10d. Tom mailed his friends with the details/??with the documents
10e. ??Tom mailed all his friends
10f. ??Tom has been mailing all afternoon
10g. [the mailing of the documents] took all afternoon
10h. ??[the mailing of the clients] took all afternoon

Here we find that *mail* supports many of the same conceptualisations as *e-mail* but not all of them. Quite serious doubts may be entertained about the acceptability of (10e) and (10f): unlike *e-mail*, *mail* does not seem to accept the construal that we glossed above as 'contact by x means'. Given these disparities between the two verbs (which a priori one might have expected to behave alike), the question naturally arises of just what it might be in the lexical content of *e-mail*, as opposed to that of *mail*, that accounts for the different behaviour of the two verbs. We will return to this question when we have observed a verb that is virtually identical to *e-mail*: *fax*.

11a. Tom faxed the document
11b. Tom faxed the document to his friends
11c. Tom faxed his friends the document
11d. Tom faxed his friends with the information/with the document
11e. Tom has faxed all his friends
11f. Tom has been faxing all afternoon
11g. [the faxing of the documents] took all afternoon
11h. [the faxing of the clients] took all afternoon

Why should *fax* and *e-mail* present this (virtually complete) similarity? In particular, why should they allow structures that are not possible with *mail* and *present* and *send*? What we will suggest is that their lexical content contains two significant types of semantic component: directionality and manner. Directionality is what allows these verbs to be assimilated to the *send* model. Indeed, *send* has little other meaning than 'release something in the direction of someone else'. It encodes no information about 'how' this is to happen, only what we might think of as the 'result'. *Fax* and *e-mail* by contrast include information about a type of process: both describe not only the releasing of a document (for instance) to someone else but also the

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[10] [4]Other verbs that behave like *present* are: *credit, entrust, furnish, issue, leave, provide, supply, trust.* Most of these also allow an NP PP(*to*) structure (on the *send* pattern exemplified in (4b) above): *Tom entrusted the documents to his friends* (compare: *Tom entrusted his friends with the documents*). That the NP PP(*with*) structure is somehow less basic that the NP PP(*to*) structure is clear from the fact that it is not possible with an *-ing* nominalisation, while the latter is:**the presenting of the winners with their prizes* vs *the presenting of the prizes to the winners*.

way this is brought about ('by faxing', 'by e-mailing'). Put succinctly, they encode both the result and the process. The presence of this process meaning accounts for those structures that are not possible with 'result-phase-only' verbs such as *send*, i.e. (5b) & (6b). It is this process meaning present in the two verbs that accounts for the possibility of structures such as (6a), (6a') & (11d): the process meaning can itself be thought of as an effect: the clients are 'e-mailed' or 'faxed', i.e. somehow affected by these processes. This would also account for the difference vis-a-vis *present*: this verb only supports the 'effect on the clients' interpretation when the PP representing the transmitted entity is present. In itself it is insufficiently explicit regarding the process to allow an Object NP to be understood as being involved in any way other than as 'transmitted entity'.

The point that emerges from this is a dual one: (i) there are *non-obvious features* of the meaning of *e-mail* and *fax* (features that go beyond their valency and their thematic roles in the strict sense) that account for their appearance in structures which are not allowed with *send*; (ii) these non-obvious features of the meaning must somehow be present - and recognisably so - in large numbers of verbs, since it is clearly possible for native speakers to detect their presence (albeit unconsciously) in new coinages (*email* itself is a relatively new coinage). To summarise then, we are claiming that within the `meanings' of verbs in the general sense of the term there are syntactically relevant semantic features that have to be taken account of in addition to - or perhaps in place of - more obvious characteristics of the verb such as its valency.

6. The internal argument and its semantic basis

One of the central questions in the study of the relationship between verb meaning and mapping of arguments onto syntactic structure concerns the realisation of the internal argument(s) of the verb (by "internal argument" we mean we mean any argument realised internally i.e. in VP the lexical projection of the V; the subject, which is realised outside VP, is termed the "external argument"). As is well known, certain verbs allow this argument to be realised as an (Object) NP, while others do not allow this and the argument must receive a PP realisation. These two cases are illustrated by *inspect* and *look* respectively:

1a. Tom inspected the manuscript
1b. *Tom inspected at the manuscript
2a. *Tom looked the manuscript
2b. Tom looked at the manuscript

The obvious question raised by cases such as these may be put as follows: assuming that the choice of an NP realisation or a PP realisation for the internal argument of a given verb is systematic (rather than simply being random), and assuming further that the basis for the choice resides somewhere in the meaning of the verb, what precisely is the factor that results in the choice of an NP realisation with *inspect* (and verbs like it) and a PP realisation in the case of *look* (and verbs like it)? That there is no obvious answer to this question will be apparent from the fact that *inspect the manuscript* and *look at the manuscript* could be used to describe very much the same real-world situation. Indeed the similarity of overall meaning between the two verbs simply serves to underline the problem. Why should *inspect* behave syntactically (at least in respect of the realisation it gives its internal argument) in the same way as (say) *destroy*, with which - at first sight at least - it has nothing in common, instead of behaving like *look*, with which it has an obvious semantic similarity?

The comparison with *destroy* is a pertinent one because this verb is one for which the

thematic role of 'patient' is often posited. Indeed it may be thought of as a central case, in that the entity corresponding to the internal argument is understood to undergo some effect as a result of the verbal action. Thus in the following example:

3a. Jane destroyed the letter

the NP *the letter* is understood to be an "affected entity". This same interpretation may be obtained with innumerable other verbs that require an NP realisation for their internal argument:

3b. Jane burnt the letter
3c. Jane shredded the letter
3d. Jane rewrote the letter
3e. Jane addressed the letter
3f. Jane framed the letter

In all these cases the NP Object is understood as "affected entity" in an intuitively obvious way: it is understood to undergo some change of state as a direct result of the verbal action.

Conversely, looking at something would not normally be thought of as involving any effect on it (one might capture the difference between the two verbs by saying that *look* names an activity rather than an effect while *destroy* names an effect rather than an activity). Thus the internal argument of the verb *look* will not be understood as an affected entity and as a consequence a thematic role of patient will not be posited for this verb. That there is indeed a correspondence between the PP realisation and the semantic status of the argument entity as "non-affected" is confirmed by a series of verbs that allow both a PP realisation and an NP realisation, with a significant difference in meaning - and one that is perfectly in line with the distinction between affected entity and non-affected entity - between the two realisations (these verbs are said to manifest the "Conative Alternation"):

4a. The cat scratched <u>the vet</u>
4b. The cat scratched <u>at the vet</u>
5a. The arrested demonstrator kicked <u>the policeman</u>
5b. The arrested demonstrator kicked <u>at the policeman</u>
6a. The climber grasped <u>the rope</u>
6b. The climber grasped <u>at the rope</u>

In all these cases the difference between the version with the NP object and the one with the PP complement is the same: in the first version the normal effect of scratching, kicking and grasping is understood to be instantiated, while in the second version the same basic action takes place but without the usual effect. Thus (5b) would be true if the demonstrator made no actual physical contact with the policeman, while (5a) would not. Virtually the same could be said for the other cases.

Returning to *inspect*, the problem will immediately be obvious: at first sight *inspect* seems to mean much the same thing as *look* and so there seems to be no reason why it should project a patient role, Syntactically, however, it behaves (as noted above) exactly like *destroy* (at least in respect of the syntactic realisation of its internal argument). What are we to say? One possibility might be to relax the definition of patient so that it is understood to cover cases where the verb does not involve any actual effect on the argument entity. Indeed we might go as far as to posit the patient role for the internal argument of any verb that turns out in the syntax as an (Object) NP (though we would need to make an exception at least for psychological verbs). This might in fact seem a wise move, given that many verbs which select an NP realisation for their internal argument do not force us to think of the entity in question as undergoing a change of state in the same (obvious) way that we think of the

internal argument entity of *destroy* as undergoing a change of state. Indeed this is already true of two of the verbs above: *kick* and *grasp* do not (necessarily) involve any change of state in the entity that is kicked or grasped: in the case of kicking some visible effect (indicative of a change of state) may be expected but it is not strictly necessary. With grasping it would not even normally be expected. Even so, the problem with relaxing the definition of patient so far as to include cases such as *inspect* (and this does indeed involve taking it further than in the cases of *kick* and *grasp*, since these verbs at least involve physical contact with the internal argument entity while *inspect* does not[11]), is clearly that, if we do this, we have no obvious reason for expecting *look* to require a PP rather than an NP realisation. If, then, we want to maintain the idea that the syntactic differences between *inspect* and *look* are semantically based (and the alternative seems is to declare them to be arbitrary), we must search for some semantic difference between the two verbs that has escaped us so far. Clearly this difference is going to be of a non-obvious type. We will return to this question below. For the moment we will say that the difference between *inspect* and *look* may be analogous to the difference between the two uses of *climb* which we exemplify here:

7a. Tom climbed the mountain

7b. Tom climbed up the mountain

These two sentences could be used to describe much the same real world event. They differ from the Conative Alternation examples above in that the actions in (7b) is not understood to be somehow incomplete in the way that the actions in (4a), (5a) & (6a) are. Both formulations can be used to describe an event in which Tom reaches the top of the mountain. Nevertheless, in some sense the idea of the action as intrinsically involving a completion point (in this case arrival at the summit) is more strongly present in the first case than in the second. This is confirmed by the following test, which involves checking the compatibility of each formulation with two different types of duration PP: *in X time* (e.g. *in three hours/in two weeks*) and *for X time* (e.g. *for three hours/for two weeks*). We may observe that the latter type shows compatibility with verbs that involve an inherent completion point while the former shows compatibility with verbs that do not have this semantic feature:

8a. The pill dissolved in three minutes/??for three minutes

8b. Tom danced for ten minutes/??in three minutes

Dissolving is an event that has an inherent completion point: any given event of dissolving must perforce come to an end when the entity involved in it is exhausted (i.e. completely used up or dissolved) - we cannot think of dissolving without conceptualising at as an event involving some entity such that the duration of the event is necessarily linked to the gradual depletion of this entity. Dancing, on the other hand, is not an event with a built-in completion point: there is nothing in the *conceptualisation* underlying this verb that obliges us to think of an event of dancing as inherently limited (it is not measured out in terms of anything), though of course in the real world extrinsic factors such as human tiredness may intervene to limit the actual duration. What we see if we apply this test to *climb* in its two syntactic realisations is as

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[11] [5] The problem could be reformulated in terms of the traditional notion of transitivity. This has always been a syntactico-semantic notion: verbs have Objects when the action they denote is understood to "pass over" from the subject entity (the agent responsible for it) to another entity (represented syntactically as the Object). Where the action does not "pass over" to another entity the verb is intransitive (no Object can appear); where the verbal action involves some other entity but does not actually "pass over" to that entity the verb is followed by a P (and is classed as intransitive).

follows:
7'a. Tom climbed the mountain in two hours/??for two hours
7'b. Tom climbed up the mountain for two hours/in two hours
The judgement given for the *for X time* of (7'a) is not an absolute one (it is not marked as ungrammatical) but many native speakers feel uncomfortable with a formulation of this type and they often point out that a more natural way of expressing this idea (viz. that Tom climbed for two hours but without reaching the top) is to use the first version of (7'b). The results of this test allow us to conclude that *climb NP* has a built-in completion point while *climb PP* does not. Another way of putting this is to say that *climb NP* is a telic predication while *climb PP* is atelic. Let us now apply the same test to *inspect* and *look*:
9a. Jane inspected the manuscript in two hours/?for two hours
9b. Jane looked at the manuscript for two hours/??in two hours
Here the judgements are perhaps even less strong than in the case of *climb*; however, a preference is undoubtedly felt for *in X time* with *inspect* and for *for X time* with *look*[12]. This suggests that *inspect* and *look* - while having very similar meanings in an intuitive sense exactly as *climb NP* and *climb PP* do in an even more obvious way - are nevertheless associated with different abstract conceptualisations. Since they also behave differently syntactically (in a way parallel to the two possibilities with *climb*) the obvious conclusion to draw is that their syntactic differences are to be attributed to this. This offers us - at least in embryonic form - a different approach to the semantics of the Object NP: instead of (or possibly as an alternative to) being an "affected entity", it might be thought of as representing the syntactic realisation of that entity which contributes to the individuation of the event - in the cases under discussion (*inspect/climb NP*) by constituting that entity that "measures out" the event. We will develop this idea further below. Notice that what we are in fact doing is to replace a every-day concept of what "patient" might be with a more sophisticated one based on an idea of abstract event structure.

7. The verb *hammer* and the notion of "effect"

The verb *hammer* belongs to a substantial group of verbs derived by "zero derivation" (i.e. without the addition of any morphological affix) from members of the category N. Zero-derivation is common in English and produces verbs from other lexical classes (from Adj: *They tried to calm him/After six months her charms began to pale*. From P: *They have upped the prices*. Zero derivation verbs often show a wide variety of syntactic possibilities (perhaps because there is no affix to narrow down their meanings) and *hammer* (derived from the noun corresponding to Italian *martello*) is no exception:
1a. Tom hammered the nail
1b. Tom hammered the nail into the wall/in
1c. Tom hammered the metal
1d. Tom hammered the metal flat/out

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[12] [6] Again the dispreferred alternatives are not ungrammatical in the strict sense. However, *Tom inspected the manuscript in two hours* is absolutely natural while *Tom looked at the manuscript in two hours* is commonly felt to be forced. There is a strong preference for *for X time* in this case. Similarly *Tom inspected the manuscript for two hours* strongly suggests incompleteness: two hours were devoted to the task but completing it would have required more time.

1e. Tom hammered on the nail
1f. Tom hammered at the nail
1g. Tom has been hammering for hours
1h. This metal hammers out/flat easily
1i. These nails hammer into the wall easily
1j. *These nails hammer easily

Before entering into the detailed analysis of these examples it would perhaps be worth clarifying what we are looking for. In the preceding section we rejected a straightforward idea of the Object NP as being the realisation of the patient role in the sense of "affected entity". As we saw, whatever the definition of the patient role (assuming that we wish to retain the term), the content cannot always be equated with a change of state in the entity corresponding to the Object NP. As an alternative account of the semantic features relevant to the syntactic realisation of an argument as Object NP we came up with the idea of "the entity that measures out the event" (this would probably subsume affected entity). What we are hoping to find, then, in the examples with *hammer* is further evidence to support our new definition of the semantic common denominator underlying the Object, or, failing that, evidence pointing towards how this concept might be further modified.

Starting with the examples, *hammer* appears in the following syntactic realisations: intransitively in (1g); with an internal argument realised as a PP in (1e) and (1f); transitively in (1a) and (1c); transitively again in (1b) but with the addition of a second internal argument in the form of a locative goal PP in (1b); transitively with a secondary predicate in (1d); intransitively or superficially so (in Middle or Mediopassive structures - see below) in (1h) and (1i)- significantly these Middle structures are only grammatical when they involve a locative goal PP or a secondary predicate; (1j), which has neither of these, is ungrammatical. We might begin by suggesting that the intransitive use of *hammer* in (1g) indicates that it can be conceptualised as an "activity" rather than as something necessarily involving an "effect". Verbs that are conceptualised as effects and effects alone often refuse intransitive uses similar to (1g) (ergative intransitive uses are another matter):

2a. Tom is destroying his old love letters
2b. *Tom is destroying

Compare these with:

3a. Tom was polishing the floor
3b. Tom was polishing

We might think of *destroy* as naming an "effect": in fact it includes no information about how this effect is achieved. *Polish* by contrast names both an "activity" (or process) and an effect (polishing is both what goes on and the final effect it produces). Not all "effect only" verbs behave like *destroy* but it is fairly representative. What (1g) suggests is that *hammer* is like *polish* insofar as it too can be used intransitively (a use which might be said to involve defocusing of the effect). So, if *hammer* can be conceptualised as an activity, can it also be conceptualised as an effect? Here the answer will have to be rather varied. Ostensibly there are three structures where *hammer* is followed by an NP and which might therefore be considered to be syntactic realisations of an "effect" conceptualisation: (1a) & (1c) (we will take these two be two tokens of the same structure), (1b) & (1d). We will deal with the last two first. As we observed above, sentence (1b) presents, in addition to the Object NP, a locative goal PP, while in (1d) the verb is accompanied by a secondary predicate. The result of both these additions at the semantic level is the same: the entity corresponding to the internal argument of *hammer* is understood to undergo a change of position or change of state (in the one case it

finishes up in the wood; in the other it finishes up flat).
Both additions seem to provide an end-point for the event of hammering & the event becomes one in which a final state is gradually approximated to as the actions proceeds (basically these are now incremental events). This makes *hammer* rather like *polish*. That these predications are telic in character is clearly demonstrated by their preference for *in X time* duration phrases:
4a. Tom hammered the nail into the wall in 5 minutes/??for 5 minutes
4b. Tom hammered the metal flat in 5 minutes/?for 5 minutes[13]
Turning now to the other structure (i.e. (1a) or (1c)), if we submit this to the same test, we find that it gives the opposite result:
4c. Tom hammered the metal for 10 minutes/*in 10 minutes
4d. Tom hammered the nail for 10 minutes/*in 10 minutes
Thus on its own the NP *the nail/the metal* fails to measure out the event in the way that these same NPs do when combined with the secondary predicate *flat* or the locative PP *into the wall*. Thus hammering alone, without an additional element to describe the resulting state of what is hammered, behaves linguistically as an atelic predication. As such it denotes no "effect" in that no resulting state is understood to be produced. This may conflict with one's immediate intuition to the effect that hammering something usually changes it. It may also conflict with a physicist's view, viz. that any act of this sort that actually makes contact with an object will leave some trace, be it only a microscopic one. Arguably, neither of these objections is relevant: first of all, whether or not it is usual for sentences such as (1a) to be interpreted as meaning that some change of state is produced in the nail may be a matter of the implicatures normally associated with such sentences rather than part of its semantic content. Secondly, there is no reason to think that human event conceptualisations are such as to take account of what is observable only to those with special equipment designed to render visible what would not normally be so. The fact remains that in respect of the linguistic feature of telicity - [+/-TELIC] - *hammer the nail* falls into the same class as *hammer* (with no object or followed by a PP as in (1e) and (1f)) or, for that matter, *look, climb up the mountain*, *grasp at the rope, dance*, or any of the other atelic predications we have mentioned.

The presence of an "effect" in the sense just discussed - the idea that the predication is understood as an event producing some change of state in the internal argument entity - is clearly of no little relevance on the syntactic level: as we observed above, the possibility of deriving a Middle structure with the verb *hammer* exists only when the additional elements that give the telic character to the predication in (1b) and (1d) are present; (1j), where the locative goal PP and secondary predicate AdjP are both absent, is not grammatical.

To summarise, what we have just seen is that, depending on the presence or absence of the appropriate elements, a given verb may be associated with one abstract event structure or another. In the case of *hammer* we may associate this verb with an atelic event structure (an event structure that fails to result in a change of state) or, assuming that appropriate elements accompany the verb, with a telic event structure (one where an activity leads to a result). Depending on which of these is triggered, we will or will not be able to derive a Middle structure. Thus the syntactic relevance of the abstract event structures with which verbs are associated has been demonstrated.

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[13] [7] The second version of (4b) would invite the interpretation: "Tom did a bit of hammering the metal and then stopped, either reducing of it to partial flatness or reducing a part of it to complete flatness". A more natural way of saying this would be: *Tom hammered the metal for 5 minutes* or *Tom tried to hammer the metal flat for 5 minutes*.

8. Accomplishments, achievements & activities

We will now pursue that idea, which emerged in the immediately preceding discussion, that the direct internal argument exercises a crucial role in determining the event structure. We will consider various syntactic possibilities with the verb *boil* (used transitively):

6a. Tom boiled the water
6b. Tom boiled the potatoes
6c. Tom boiled the teatowels

In each case the verb is followed by an NP, a direct internal argument. What we will attempt to show on the basis of these examples is that in each case the entity corresponding to the internal argument NP establishes a different type of event structure, and that this then determines the possibility of deriving other syntactic structures - the `alternations' mentioned earlier and of which *load* is a prime example. Let us begin by considering (6a) and (6b). Each of these sentences allows two readings, one in which the entity encoded as the direct object NP delimits the event and one in which it doesn't. Thus (6a) can be understood either as presenting a simple process in which the water remains at boiling point for whatever time is indicated or as presenting an event with a culminating point, consisting of a change of the state (of the water). In this interpretation the water *reaches* boiling point (rather than simply being at boiling point)[14]. Similarly (6b) can either mean simply that the potatoes were kept at boiling point for a certain period of time or that some culminating point was reached consisting in a change of state (of the potatoes). With both sentences the two interpretations may be teased apart by the use of different (adverbial) specifiers of duration:

7a. Tom boiled the water *for* ten minutes
7b. Tom boiled the water *in* ten minutes
8a. Tom boiled the potatoes *for* ten minutes
8b. Tom boiled the potatoes *in* ten minutes

Thus sentence (7a), with the duration specifier *for ten minutes*, can only have the interpretation in which the water was kept at boiling point for the specified duration; by contrast, (7b) can only have the interpretation in which a change was effected in the water (consisting in its reaching boiling point). Moving on to (8), the (a) sentence can only mean that the potatoes were held at boiling point for the ten minutes in question, while the (b) sentence must mean that some change was effected in the potatoes. In general the two types of duration specifiers, *for x time* and *in x time*, are show compatibility with different types of event. To see this, it is sufficient to consider the following data:

9a. Tom reached the summit in fifteen minutes
9b. *Tom reached the summit for fifteen minutes
10a. *Tom pushed the pram in ten minutes
10b. Tom pushed the pram for ten minutes

Thus *reach the summit*, which inherently involves a culminating point, is compatible only with *in x time* adverbials, while *push the pram*, which contains no culminating point, is compatible with *for x time* adverbials but gives rise to ungrammaticality with the other sort. The point about the predications *boil the water* and *boil the potatoes* is that, unlike *reach the*

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[14] [8] Interestingly it seems that (6a) must have either the one interpretation or the other. It cannot mean at one and the same time that Tom brought the water to the boil and kept it there for some time.

summit and *push the pram*, they do not have a fixed value in respect of the feature - [+/- culminating point] - that distinguishes these two predications. Depending on the context, they may be interpreted as having or not having this feature, and, as we saw in (7) and (8), the feature in question may be triggered by the appropriate accompanying duration adverbial.

Now, as we have seen, the original sentences (6a) and (6b) may be understood either as presenting an event with a culminating point or as presenting one without a culminating point. In this respect they differ from (6c), which accepts the latter interpretation but seems to resist the former. This is confirmed by the following:

11a. Tom boiled the teatowels for ten minutes
11b. *Tom boiled the teatowels in ten minutes

On the question of why the combination of *boil* and *the teatowels* fails to trigger a reading in which the event has a culminating point, we might say that we are not used to thinking of the process of boiling as producing any change in teatowels, while this same process is commonly associated with a change in water and in potatoes. Indeed, if it is expressly pointed out to native speakers that (11b) is intended to mean that the teatowels were cleaned (i.e. sterilised) through boiling, they begin to find it more acceptable[15].

To summarise, the difference between (6c) and (6b) is that the former lacks any sort of culminating point, while the latter may be interpreted as having one (a change in the state of the potatoes). Both involve a process in which the objects in question are held in boiling water. Thus we may represent the event structure of the two predications as follows:

12a. **"boil the teatowels"**
Structure of event = process
Type of actional structure = ACTIVITY
b. **"boil the potatoes"**
Structure of event (i) = process + result (culminating point)
Type of actional structure = ACCOMPLISHMENT
Structure of event (ii) = process
Type of actional structure = ACTIVITY

Representation (2b) shows that *boil the potatoes* can be interpreted as having either of two event structures, a process and result or just a process. The names `activity' and `accomplishment' are well established in the literature (they were originally introduced by Vendler 1967 and were initially applied to the study of aspect and actionality in verbs). We may now compare these two event structures with (6a). As we have already established, (6a) may be understood as containing a culminating point (the point at which the water reaches 100°). This means it is like (6b) and different from (6c). On closer examination, however, it turns out to be substantially different also from (6b). In order to appreciate this it is sufficient to realise that with these two predications, the culminating point - consisting in a change of state - is reached in two different ways, depending on whether we are talking of the water or the potatoes. With the potatoes the boiling starts before the change of state, which is the

[15] [9] A crucial difference between *boil the teatowels* and *boil the water/the potatoes* is that with the latter two predications some change in the water or the potatoes inevitably occurs if the process is continued for long enough; the same cannot be said of the teatowels. Any change in these is, in the end, quite incidental to the process of boiling, in a way that it is not with potatoes or carrots or indeed the water itself.

culmination point of it; with the water the boiling is itself the culminating point - what happens before may be properly called `heating' the water but it is not properly referred to as `boiling'. What this means is that the predication *boil the water* - when understood as in (7b) - in fact denotes only a culminating point and no preliminary process. We may represent this as follows:

12. c. **"boil the water"**
Structure of event (i) = result (culminating point)
Type of actional structure = ACHIEVEMENT

Thus *boil the water* is represented as having only a result phase, with no process. This type of predication is known as an `achievement'. Of course, as we observed above, this same predication can also be read as not having a culminating point, in which case we will represent its event structure as follows:

12. c'. Structure of event (ii) = process
Type of actional structure = ACTIVITY

The difference between (6a) and (6b) is well brought out by these sentences in which the adverb *almost* has been inserted:
13a. Tom almost boiled the water
13b. Tom almost boiled the potatoes
(13b) is in fact ambiguous: it can either mean that Tom came near to starting the whole process of boiling the potatoes but finally did not start it or it can mean that he started boiling them but stopped the process short of its culminating point (i.e. the potatoes were not allowed to undergo the change of state conventionally associated with boiling them. So in this second reading boiling took place, only the final result was not obtained. By contrast, in (13a) nothing that can properly be referred to as boiling can be understood to have taken place. Thus the two predications give different interpretations when combined with the adverb *almost*.

The main point of this discussion has been to show that the three sentences in (6) can be understood as having very different event structures. In each case the event structure resulted from the combination of the verb and its internal argument. This provided further confirmation of what we already observed apropos of the *load* class: that it is the internal argument - and not the external one - that determines the event structure. The question we must now raise is whether these differences in event structure can be used to predict differences in syntactic behaviour on the part of the predications in question.

The first important difference concerns the possibility of inserting an additional argument known as the `benefactive': *Mary* in *Tom baked Mary a cake*. We find that this is possible with accomplishments and achievements but not with activities:
14a. Tom boiled Mary some water
14b. Tom boiled Mary some potatoes
14c. *Tom boiled Mary some teatowels
The second difference concerns a structure called the Middle (or `mediopassive'). We will briefly introduce this structure, starting with the following examples (the Middle is exemplified in (15b); (15a) is for comparison):
15a. This knife cuts well
15b. This bread cuts well

In (15a) the entity realised syntactically as subject, `the knife', is perhaps not semantically the most common type of subject of the verb *cut* (sentences such as *Tom cut the rope* would be felt to be more natural). It is, however, possible outside the structure illustrated in (15a):

15c. This is the knife that cut the ribbon at the opening ceremony of the new library.

In (15b), by contrast, we have an NP in subject position that, with a verb such as *cut*, could otherwise appear in this position only in a passive sentence:

15d. This bread was cut by Richard

And indeed the interpretation of (15b), in sharp contrast to (15a), does have something passive about it: the bread is understood as undergoing the action of cutting (in (15a) the knife is not the undergoer, any more than it is in (15c)). However, despite this interpretative similarity with (15d), (15b) is not syntactically or morphologically passive (there is no auxiliary and the verb is not in the participle form). It is also unlike a normal passive in not allowing the addition of an `agent' PP:

15e. *This bread cuts well by Richard

Notionally, however, sentences such as (15b) are understood to represent agentive processes (i.e. an agent role is involved even if this cannot be spelled out). It thus contrasts with cases such as the following:

15f. The bread simply disintegrated in his hands

15g. The bread crumbled as it was unwrapped

The verbs *disintegrate* and *crumble* in these sentences are understood to represent non-agentive events; they are said to be used `ergatively' (see discussion below). The interpretation of (15b) is that the bread in question has the property of allowing itself to be cut without difficulty. This is the typical interpretation of MIddle sentences.

Having introduced the Middle structure, we may now ask which of our three predications involving *boil* can appear felicitously in this structure. The Middle is a highly restricted structure, in the sense that it is an alternation that is by no means available with all transitive verbs. The answer is given in (16):

16a. *This water boils easily - ACHIEVEMENT

16b. These potatoes boil easily - ACCOMPLISHMENT

16c. ??These teatowels boil easily - ACTIVITY

What we observe is that only the accomplishment predication gives a fully well-formed Middle structure in this case[16]. Leaving aside for the moment the question of activity predicates (some of which do in fact allow well-formed middles), we see that in the following sentences the accomplishment predication all give good middle structures, while the achievement predications do not:

17a. Tom polished the silver - ACCOMPLISHMENT

17a'. This silver polishes well

17b. Tom chopped the carrots - ACCOMPLISHMENT

17b'. These carrots chop easily

[16] [10] It should be pointed out that (16a) is perfectly acceptable in an ergative reading, such as the one we observed with (15f) and (15g). In order to illustrate this reading better and to contextualise it adequately we will give the following example:

(i) Don't reheat the soup on that burner: it will boil very easily

The idea is that the person responsible for reheating the soup should avoid the `fast' burner on the cooker since using it could lead to the undesirable result of the soup boiling (instead of being reheated gently). Crucially, in this case the event is understood as something spontaneous, not as agentively induced.

17c. Tom sliced the cheese - ACCOMPLISHMENT
17c'. This cheese slices easily
17d. Tom ironed the shirts - ACCOMPLISHMENT
17d'. These shirts iron easily
17e. Tom painted the lampposts - ACCOMPLISHMENT
17e'. These lampposts paint easily
17f. Tom mixed the ingredients - ACCOMPLISHMENT
17f'. These ingredients mix easily
18a. Tom destroyed the documents - ACHIEVEMENT
18a'. ??These documents destroy easily
18b. Tom killed the chickens - ACHIEVEMENT
18b'. ??These chickens kill easily
18c. Tom reached all the important summits - ACHIEVEMENT
18c'. ??Those summits do not reach easily
18d. Tom rang the doorbell - ACHIEVEMEMT
18d'. ??That bell doesn't ring easily[17]
We will return to the question of the middle below.

We will now consider one more series of examples as a further investigation of how the event structure is at the root of so many syntactic phenomena. The examples in question are as follows:
19a. Tom swept the floor
19b. Tom has been sweeping all morning
19c. ??Tom swept the crumbs
19d. Tom swept the crumbs up
19e. Tom swept the crumbs into the dustpan/under the carpet
What is interesting in these examples is that the verb *sweep* gives a perfectly well formed structure when used transitively as in (19a), but not when used - again transitively - as in (19c). Somewhat surprisingly, the object NP that is the cause of the ungrammaticality in (19c), where it appears on its own in VP, becomes fully acceptable if followed by another (prepositional) element, as in (19d) or (19e). Even more surprising, given the fact that in (19d) and (19e) both complements of the V are obligatory, is the fact that the verb can be used entirely intransitively, as shown in (19b). Thus the verb *sweep* manifests a strange sort of alternation that has something in common with the *load* alternation discussed above: like this verb, it allows its direct object position to be filled - albeit subject to the condition just noted - by two types of NPs with very different semantic features (*the floor/the crumbs*) and which represent very different participants in the event.
20a. Tom loaded *the cart* `locatio'
20b. Tom loaded *the hay* `locatum'
21a. Tom swept *the floor*
21b. Tom swept *the crumbs* .....
It is clear in intuitive terms that the two NPs *the floor* and *the crumbs* represent entities that participate in the event in very different ways. Indeed, it is even possible for both to appear

[17] [11] Like (16a) above, this sentence is not acceptable in a middle reading but fully acceptable in an ergative reading. On this reading the interpretation would be that spontaneous events of the bell ringing occur frequently.

together:
21c. Tom swept the floor of crumbs
21d. Tom swept the crumbs off the floor
Even more significantly, though both can appear (as we have just seen), they cannot be coordinated and so cast as one argument (except perhaps with humorous intent):
21e. *Tom swept the floor and the crumbs
Just as with the two arguments of *load*, it makes no sense to claim that either of them is not affected by or involved in the action; it is intuitively clear that both `the floor' and `the crumbs' in some sense undergo the action of sweeping.

The question that we will address is why the NP *the crumbs* can only appear if followed[18] by an element such as *up* or *into the dustpan*. What we will begin by considering is exactly how the entities corresponding to the NPs in question participate in the event of sweeping participate in the event and how these different ways of participating in the action in turn affect the event structure. As (19b) shows, the verb *sweep* can be interpreted simply as a process (= ACTIVITY). This is confirmed by its compatibility with the duration elements discussed above:
22a. Tom swept *for ten minutes*
22b. *Tom swept *in ten minutes*
As soon as we add the object NP *the floor*, the judgement regarding the second sentence has to change:
23a. Tom swept the floor *for ten minutes*
23b. Tom swept the floor *in ten minutes*
As we observed above duration adverbials such as *in x time* can only be used with predications that include a culmination point. It follows that the effect of including the NP *the floor* is to trigger an event structure in which a culmination point is present. In other words what would otherwise be an activity is turned into an accomplishment. Performing the same test on sentence (19c) is not easy, given that the original is of doubtful acceptability. Nevertheless, it seems possible to detect a significant difference of degree of ungrammaticality between the following:
24a. ??Tom swept the crumbs *for ten minutes*
24b. *Tom swept the crumbs *in ten minutes*
The (b) sentence, where the event would have to be understood to have a culmination point, is more strongly ungrammatical than the (a) sentence, where the event would not be understood in this way. Thus the addition of the NP *the crumbs* produces no change in how the event is

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[18] [12] It should be pointed out that (19d) has a perfectly acceptable variant in which *up* precedes the direct object NP: *Tom swept up the crumbs*. The same position is not normally available for the full PP in (19e): **Tom swept into the dustpan the crumbs* -this order is only available in cases of heavy NP shift: *Tom swept into the dustpan the crumbs and other debris that was lying around*. Significantly, elements such as *up* are not normally accented, even when in VP-final position (normally the focus position). A sentence such as *Tom swept the crumbs UP* or *Tom swept UP the crumbs, with the intonation nucleus on the P up,* is practically impossible. This does not apply to those cases where the P is understood as a full semantic predicate, as in *Tom switched the light on*. Here *on* may be understood as standing in a relation of contrast with *off* (there can be no such contrast in the case of *up* in our original example) and it is possible for it to bear the intonation nucleus: *Tom switched the light ON*.

construed (an activity remains an activity), while the addition of the NP *the floor* triggers a different event structure (an activity is turned into an accomplishment). Summarising, one might say that both `the floor' and `the crumbs' are involved in the event of sweeping, but that their involvement is different in the precise sense of delimiting the event in the first case and not delimiting it in the second. This is clear enough in the first case: a `floor' is a circumscribed area and once the sweeping action has passed over the whole of this area the event named `sweeping the floor' has, as it were, exhausted its cycle[19]. But what of `the crumbs'? One might claim that they also delimit the event, in the sense that when they have all been swept, the event named `sweeping the crumbs' has run its cycle. But in fact this is not the case. And this for the simple reason that there is no necessary limit to the duration of an action of sweeping any given set of crumbs. I can, if I so desire, sweep a certain amount of crumbs - the same crumbs -in circles around the room for hours on end. What is lacking, then, in the predication `sweep the crumbs' is the idea that as the action proceeds the quantity of crumbs is gradually used up. This is present in the case of the floor: the more I sweep, the more of the floor I transform from being dusty or dirty to being clean. Thus in this respect `sweep the crumbs' is analogous to the following:

25a. Tom beat the metal

25b. Tom felt the material

Since beating something (we are talking about inanimate entities, not about the specialised - physical punishment - sense of beating human beings) or feeling it has no necessary effect on it, the action can be continued or repeated in relation to the same entity or part of an entity *ad infinitum*. In other words, since these actions have no necessary effect, there is no sense in which the entity is involved incrementally, as it is, for instance, in `painting the wall' (painting is an action that proceeds bit by bit: the longer one paints, the more of the wall undergoes the effect and the less there is left to paint). This, then, is exactly the situation we have with `sweeping the crumbs'. In the light of what has just been said, a moment's thought about the sentences (19d) and (19e), where the NP object *the crumbs* becomes grammatical in the presence of a prepositional element, should be enough to realise that the PP *into the dustpan* or the bare P *up* give us exactly the kind of incremental effect that is absent in (19c), and also in (25a) and (25b). These prepositional elements represent the `locative goal'[20], that is to say the location where the crumbs gradually end up as the activity of sweeping proceeds. There is now an effect - ending up in the dustpan - that can be applied incrementally to the crumbs. Thus the structure of the event is now analogous to that of `paint the wall'.

The various alternations that we have observed in this section have revealed how a predication may be associated with an abstract event structure (basically a question of whether the event is understood to involve a process or a process resulting in a change or result, or simply in a change/result without a preliminary process). We have also seen that this event structure is determined by the interaction between the verb and its internal argument or arguments. Depending on the semantic category of the internal argument, any of the following

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[19] [13] Notice that an event simply named `sweeping' rather than `sweeping the floor' would not necessarily be considered to have exhausted its cycle when the whole of the floor had been swept; the action might continue into the yard (for instance).

[20] [14] Though *up* is anything but explicit about where the crumbs end up. Indeed, it is understood to mean little more than that at the conclusion of the process of sweeping the crumbs have been gathered together and removed.

are possible: (i) the same verb may give different abstract event structures (cf *boil*); (ii) the same verb may select the same abstract event structure (accomplishment) building it around each of its internal arguments in turn (*load*); (iii) the verb may change its abstract event structure (from activity to accomplishment) by selecting a semantically appropriate single argument or by selecting a pair of arguments that together produce the same effect (*sweep*).

9. Underspecification of predications

In the preceding section we observed how the abstract event structure associated with a given predication may be the result of the interaction between the verb and its internal argument. The last case discussed there, involving the verb *sweep*, was particularly interesting, since its seemed that the acceptability of an argument NP *the crumbs* depended, to some extent at least, on the presence of another argument, in the case in point the locative goal PP *into the dustpan*. Indeed, the NP in question is not fully acceptable as direct internal argument of *sweep* if the locative goal PP is not present. We repeat the relevant examples here:

1a. Tom swept the floor
1b. Tom has been sweeping all morning
1c. ??Tom swept the crumbs
1d. Tom swept the crumbs up
1e. Tom swept the crumbs into the dustpan/under the carpet

At the end of the previous section we argued that the addition of the locative goal, as in examples (1d) and (1e), had the effect of triggering an abstract event structure of the accomplishment type (the verb *sweep* basically having an activity event structure - as in (1b)). Thus in (1d) and (1e) the combination of internal arguments achieves the same effect - triggering an event structure more complicated than a simple activity - as the single NP internal argument in (1a). The status of the NP *the crumbs* is thus revealed to be curious: it cannot stand alone as direct object and yet semantically it is undoubtedly an `argument' of *sweep* in that clearly any conceptualisation of `sweeping' will probably include a participant role for whatever it is that is gathered or removed through this activity. Translated into more technical language, the NP *the crumbs* is not licensed as direct object of *sweep* except when - thanks to the presence of a locative goal argument - an abstract event structure of the accomplishment type is triggered. What this suggests is that certain arguments are licensed by the verb directly but rather by the abstract event structure. In other words, `the crumbs', rather than being a full argument of *sweep* in the sense of one that it can license directly, is an `argument' only at the level of conceptual structure (LCS). What this means is that it represents one of the possible participants in an event of sweeping in the broadest conception of this type of event. In order for this participant to be foregrounded (as it were) and to be fully activated as a syntactic argument, a specific type of event structure must be triggered. And this cannot be triggered by this argument on its own.

In the light of what we have just observed regarding the verb *sweep*, we will now consider the verb *clear*. In many respects this verb resembles *sweep*. Indeed, it presents essentially the same alternation, with much the same restriction on one of the possible realisations:

2a. Tom cleared his desk
2b. *Tom cleared the papers
2c. Tom cleared the papers off his desk
2d. Tom cleared the papers up/away

What is particularly interesting about this verb is that, unlike *sweep*, it cannot be used intransitively (compare (1b)):

2e. *Tom has been clearing all morning

2f. Tom has been clearing his desk all morning

The intransitive sentence (2e) becomes grammatical if the prepositional particle *up* is included:

2g. Tom has been clearing **up** all morning

The facts observed in (2e) - (2g) are particularly puzzling: the verb *clear* cannot be used intransitively but such a use becomes possible if a particle is included. Generally speaking, if a verb cannot be used intransitively it is because its event structure lacks a process phase, consisting only of a result. This would seem to be a reasonable account in the case of *destroy*, for instance:

3a. They have been destroying copies of that book all morning

3b. *They have been destroying all morning

This captures the contrast between this verb and others such as *sweep*, which occurs freely as an intransitive, and basically has an activity event structure (as hypothesised above). The problem, however, is that this leaves us with no account of why (2g) should be fully grammatical. What we will suggest is that *clear*, though essentially a `result' verb like *destroy*, differs from this verb in not being able to license any internal argument directly. It is this property that, paradoxically, accounts for the grammaticality of (2g). As we have already seen with *sweep*, the licensing of an argument may depend on the triggering of a specific event structure, and this (accomplishment) event structure may be triggered by the particle *up* (compare (1c) and (1d) above). Let us suppose that (2g), the sentence in which *clear* is grammatical despite being used intransitively, owes its acceptability to the accomplishment event structure triggered by the particle. Optionally, the NP argument that would be licensed by this event structure is not realised in the syntax, but the argument remains implicit. The important point is that the particle gives an accomplishment event structure and this includes a process phase. It is this that allows the intransitive use, since the verb *clear* no longer encodes a result phase only. Without the particle, this is exactly the situation that obtains, and thus, like all intransitive structures with result-only verbs, (2e) is ungrammatical. `Clearing up' is thus a type of activity leading to a result. Indeed, it has the semantic autonomy of a process verb: `clearing up' is intelligible on its own (as `tidying'), whilst `clearing' is not. On its own, the verb *clear* (a deadjectival verb) lexicalises nothing more than a resulting state. In principle this could be the resulting state of anything (the verb does not specify what type of entity might be involved). In general it is verbs that include a process phase that exercise narrow s-selection requirements on their internal arguments.

10. Intransitive: the Middle or Mediopassive structure

This structure is exemplified by the following:

1a. This sweater washes very well

In this type of structure the verb, which is morphologically active, is accompanied in the surface syntax by a single argument (*this sweater*), realised syntactically in subject position. At first sight it might seem natural to speak of an intransitive use of the verb. And yet a moment's reflection is sufficient to realise that the type of 'washing' event we understand here is one that involves two participants (and therefore syntactically requires two

arguments). This is confirmed by our intuition that washing of a sweater cannot normally be something the sweater does or a spontaneous event involving the sweater. This is also true of the following:

1b. This machine washes very well

1c. This machine washes and dries

And yet there is an important difference between these cases and (1a). Semantically the difference is evident in the fact that the NP subject in these cases, though not perhaps an ideal agent argument (given that it is not [+ animate]), is nevertheless the type of entity that is typically associated with performance of the action of washing rather than with undergoing it). The opposite is true of (1a): sweaters are not only [- animate], they are also things that are typically washed (and as such quite implausible as agents of this process). This is confirmed by the overall interpretation of the sentence, which seems to be something like "This sweater undergoes the process of washing without difficulty". On this basis, then, it seems that (1a) cannot be analysed as having a normal agent subject; rather it should be thought of as having a patient argument in its Subject position. This means that it is radically different from (1b) and (1c); further proof of this comes from the fact that in (1b) and (1c) a second argument could be inserted:

1b'. This machine washes [silk] very well

1c'. This machine washes [clothes] and dries [them]

while in (1a) it could not:

1a'. *This sweater washes [the clothes] very well

This is hardly surprising: while sentences (1b') and (1c') have - as we said - normal agent subjects, (1a') has a subject with the patient role (in this respect it resembles a passive). Assuming a close connection between agent role and subject position on the one hand and patient role and object position on the other, it follows that the agent arguments in the original (1b) and (1c) are in their natural positions but the patient argument in (1a) is in the 'wrong position': as patient it should be in Object position. Let us formalise this intuition by claiming that the NP *this sweater* in (1a'), though superficially located in Subject position, is underlyingly linked with Object position (this amounts to claiming that it is a sort of Object that has moved). Now, if we assume that each thematic role can be assigned only once in each clause, and if we further assume that the role of patient has been assigned to *this sweater* in (1a) and (1a'), we have an account of why the latter sentence is ungrammatical: the NP *the clothes* has no thematic role (and so no interpretation in respect of the verb *wash*) since the thematic role that would be semantically suited to it and that is normally assigned to an element in Object position - that of patient - has already been assigned to *this sweater*.

So we are analysing (1a) as a structure in which the verb *wash* appears with only one argument (that of patient). Unlike what happens in (1b') and (1c'), no second argument can be added because the only empty position it could fill (that of Object) and the thematic role it would be assigned in that position have already been claimed by *this sweater*. But above we noted that the process of washing normally involves two participants. Indeed, if no agent argument were implicit in such cases we would be forced to interpret washing in such contexts as a sort of 'spontaneous event' analogous to collapsing, sinking or fainting, and this would clearly be in conflict with what one understands on the basis of (1a) and sentences like it (Compare: *This table polishes well/This car handles well*). Assuming then that these sentences do indeed presuppose a second participant (and therefore presumably an agent argument), what has happened to it? It is clearly not realised explicitly in the syntax but, following the pattern observed above, it might nevertheless be present as an implicit

argument. One suggestion that has frequently been made is that in structures such as (1a) the agent argument is assigned an 'arbitrary' interpretation. In other words, it is understood as having a general value, something like "for anyone who tries", an interpretation analogous to that given to the agent in Italian sentences such as *Questa maglia si lava bene.* We will not pursue this matter any further here; instead we will simply conclude that (1a) is a sentence where the verb is superficially intransitive and underlyingly transitive, in the sense that it is understood to denote a process involving two participants (one of them patient). .