The Aspectual Interface Hypothesis

Carol Tenny
MIT Center for Cognitive Science

THE ASPECTUAL INTERFACE HYPOTHESIS

Carol Tenny

MIT Center for Cognitive Science

1. Introduction

The problem of the linking of thematic roles to syntactic argument positions is of fundamental importance because it is part of the larger problem of the connection between syntax and semantics. Theories of generative grammar have adopted, to a greater or lesser extent, the view of an autonomous syntax operating independently from the semantics of a language. Up to a certain point, this view does seem to characterize the behavior of natural language. However, the problem remains that, in spite of the evidence for the autonomy of syntax and semantics, there are strong generalizations to be made about correspondences between meaning and syntactic structure. These are familiar facts that cannot be ignored; such as the fact that in general, agents are subjects, and themes or patients are objects. Various mechanisms that have been proposed to deal with this, such as lists of linking rules that connect particular thematic roles with particular syntactic (configurational) argument positions, are somewhat stipulative and not entirely satisfactory. More principled approaches to the problem have been presented in the recent literature, in the form of hypotheses that there are uniform and universal constraints on the mapping between syntax and lexical semantics. Perlmutter and Postal (1984) proposed the Universal Alignment Hypothesis (UAH) in the framework of Relational Grammar:

CAROL TENNY

Universal Alignment Hypothesis (UAH)

There exist principles of universal grammar which predict
the initial relation borne by each nominal in a given clause
from the meaning of the clause.

And Baker (1985) proposed the Universal Theta Assignment Hypothesis
(UTAH), in the framework of Government and Binding Theory:

Universal Theta Assignment Hypothesis (UTAH)

Identical thematic relationships between items are represented
by identical structural relationships between those items at
the level of D-structure.

Both of these hypotheses propose a fundamental connection between
'meaning' and some level of syntactic representation. The UAH
maintains that general principles constraining the mapping from
lexical semantics to syntax do exist, although it gives no
indication of what they might be. The UTAH claims that the mapping
between thematic and structural relationships is consistent,
although it does not explain why the mapping is the way it is. The
UAH and the UTAH are elegant ideas that explain a variety of
phenomena in a simple way. However, these hypotheses lack an
account of the central mechanism by which thematic structure and
syntactic structure are connected. The thesis of this paper is
that aspect mediates between syntax and lexical semantics, and
provides a principled basis for hypotheses such as the UAH and the
UTAH. The Aspectual Interface Hypothesis (AIH) will be proposed to
supplant the UAH and the UTAH:

Aspectual Interface Hypothesis

The mapping between cognitive (thematic) structure and syntactic
argument structure is governed by aspectual properties. The aspectual
properties associated with internal (direct), external and oblique
(indirect) arguments constrain the kinds of event participants that can
occupy these positions. Only the aspectual part of cognitive (thematic)
structure is visible to the syntax.   (Tenny 1987)

In this paper the AIH is argued for through informal semantic
discussion. It is not given a model-theoretic treatment.

  2. The special aspectual role of the internal argument

    In the theory presented here, the crucial aspectual property
is associated with the internal argument of a verb. The verb's
internal argument 'measures out' over time the event described by
the verb. This is an aspectual property, because aspect refers to

THE ASPECTUAL INTERFACE HYPOTHESIS

the internal temporal organization of an event. The term 'measures out' is used here in an informal sense, as a convenient metaphor for uniform and consistent change, such as change along a scale. The idea of an object measuring out an event can be elucidated using the aspectual property of delimitedness. A delimited event is one that the language encodes as having an endpoint in time. The aspectual distinction between delimited and non-delimited events has a long history òf discussion in the philosophical and

linguistic literature, dating back to Aristotle.[1] The difference between linguistic representation of delimited and non-delimited events is illustrated in 1 and 2.

1 Delimited:
   a. destroy the city (in an hour/ *for an hour)
   b. climb a tree (in an hour/ ?for an hour)

2 Non-delimited:
   a. like jazz (*in a day/ for a day)
   b. push the car (*in an hour/ for an hour)

The events described by the verb phrases in 1a and 1b are delimited events; those in 2a and 2b are non-delimited events. Temporal adverbial expressions such as 'in an hour' and 'for an hour' are useful in distinguishing between a delimited and a non-delimited reading.[2]

       Now consider the verb phrases below. In their salient readings, these describe delimited events:

3   a. perform a play
     b. translate a poem

Not only do these events have temporal bounds, but these bounds are provided by the referent of the internal argument. In other words, it is the object that delimits the event. When you perform a play, you perform act one, then act two, and so on, until you conme to the end of the play. The end of the play is the end of the event. Likewise, in translating a poem, one may translate the first

----

1. Particularly notable are Vendler (1967), Dowty (1979), Hinrichs (1985), and Verkuyl (1972-1987).

2. These adverbial expressions are sensitive to lexical subtleties that make them imperfect diagnostics of delimitedness. The definition of delimitedness must be based on the existence of an understood temporal bound to the event, rather than on tests using adverbials.

CAROL TENNY

stanza, then the second stanza, then the third, until the end of
the poem is reached and the translation event is over.

A very coarse test for this idea is provided by certain
adverbials such as "halfway", which make reference to a kind of
measurement:

4   a. perform a play halfway
     b. perform half a play

     c. translate a poem halfway
     d. translate half a poem

     e. destroy the city halfway
     f. destroy half the city

Although the two verb phrases in each couplet do not mean exactly
the same thing, in each pair the second verb phrase represents one
possible way to understand the first. That is, 'halfway through
the event' may be equated with 'half of the object'.

In the examples above, the internal argument measures out the
event through its spatial extent or volume. This makes these
examples particularly clear. However, the argument need not
measure out the event through its spatial extent or volume; some
other property of the object may be invoked, as in 5 below:

5   a. redden the photograph
     b. ripen the fruit

In 5a it is the redness of the object, and in 5b it is the ripeness
of the object that measures out the event. In both cases the verb
indicates that property of its argument which is to do the
measuring.

The internal arguments in the verb phrases in 4 and 5 above
measure out and delimit the event described by the verb. However,
under the theory proposed here, all internal arguments are
constrained to measure out the event, whether or not it is
delimited. Consider 6 below:

6   a. push the cart (*in an hour/for an hour)
     b. push the cart to New York (in an hour/?for an hour)

In 6a, the verb and its direct argument describe a non-delimited
event, rather than a delimited one. In 6b however, with the
addition of a goal phrase the event becomes delimited.
Nevertheless, the cart still measures out the event in both of
these expressions. The delimitedness of 6b is achieved through

THE ASPECTUAL INTERFACE HYPOTHESIS

reference to the very property of the internal argument that is measuring out the event: namely, its location. The oblique argument -- or the goal phrase -- delimits the event by referring to that property of the direct argument that is undergoing the central change in the event. Example 6 above illustrates how the arguments of verbs that describe non-delimited events may be unified with arguments of verbs describing delimited events such as those in 4 and 5. Verbs such as "push" may be subsumed under the condition that the internal argument of the verb is constrained to measure out the event through a change in a single property. The change in the internal argument during the course of the event must be describable as a change in a single property. The event may be delimited linguistically through reference to that change or that property.

Various elements of the idea proposed in this paper -- that an internal argument measures out an event -- may be found in the work of Gruber (1965), Jackendoff (1987), Dowty (1979), Verkuyl (1972-1987), Hinrichs (1985), and Pustejovsky (1987). However, none of these authors have extended the idea to include internal arguments in general, or employed the idea as a general principle of correspondence between syntactic structure and lexical semantics.

The rest of this paper will be devoted to a discussion of the implications of this idea for 'affectedness', unaccusatives, spray/load verbs, and psych verbs.

3. Affectedness

The property of 'affectedness' has been much discussed in the literature lately. 'Affectedness' is interesting, because it is a semantic property that has been implicated in certain syntactic phenomena. An 'affected' argument has been generally described as an argument which undergoes some change. Change is a temporal phenomenon. An 'affected' argument can be more adequately described in aspectual terms, as an argument which delimits the event described by the verb.

Among the syntactic phenomena that affectedness is relevant to are middle formation and NP passivization.[3] Consider the NP-passives in 7 and 8.

----

3. See Mona Anderson (1979), Roberts (1985), and Hale and Keyser (1987) on these topics.

CAROL TENNY

7   a. The Mongols' destruction of the city.
     b. The city's destruction by the Mongols.

     c. The missionaries' conversion of the natives.
     d. The natives' conversion by the missionaires.

8   a. John's avoidance of Bill.
     b. *Bill's avoidance by John.

     c. Sally's pursuit of the cat.
     d. *The cat's pursuit by Sally.
                              (M. Anderson (1979))

     In 7 the arguments are 'affected' and NP passivization is
possible. In 8, where the arguments are not 'affected', NP
passivization does not yield good expressions. The possibility of
NP-passivization correlates closely with the delimited or
non-delimited-ness of the event, as shown in 9 by the applicability
of temporal adverbials:

9   a. destroy the city in a day/*for a day
        (the city's destruction in a day/*for a day)
    b. convert the natives in a month/??for a month
       (the native's conversion by the missionaries in a
       month/*for a month)[4]

    c. avoid Bill *in an hour/for an hour.
    d. pursue the cat *in an hour/for an hour.

     The property of 'affectedness' is actually an aspectual
property. This explains why some verbs like "perform" take
NP-passives when they do not actually seem to 'affect' their
arguments, as in 10.

10   a. The company's performance of the play.
     b. The play's performance by the company.
                              (M. Anderson (1979))

     c. John's translation of the poem.
     d. The poem's translation by John.

----

4. For some speakers, "conversion for a month" is an acceptable
expression, meaning the effects of the conversion lasted a month.
This is a different use of the temporal adverbial from that which
is indicative of the delimitedness of events.

THE ASPECTUAL INTERFACE HYPOTHESIS

An aspectual definition of 'affectedness' is more precise and unifies a wider range of relevant data, than a definition based on the imprecise notion of being 'affected' by some action.

Now consider the middles in 11 and 12.

11 a. This door opens easily (by pulling on the handle).
    b. This cinch tightens easily (if you give it a good yank).
                                      (after Hale and Keyser (1987)

    c. This door opens easily in a minute/?for a minute.
    d. This cinch tightens easily in a minute/?for a minute.

12 a. *The traffic jam avoids easily.
    b. *Fleeing burglars pursue easily.

    c. avoid the traffic jam *in a minute/for a minute
    d. pursue the burglar *in an hour/for an hour

In 11 the arguments are 'affected' arguments, and middles are possible. In 12 they are unaffected and middles are not possible. Again, in 11 the possibility of middle formation correlates with the delimitedness of the event, and in 12 the impossibility of middle formation correlates with the non-delimitedness of the event, as shown by the adverbials.

The aspectual view of 'affectedness' explains the difference in judgements speakers assign to the sentences in 13.

13 a. The desert crosses easily for settlers with large wagons.
    b. *The desert wanders easily for settlers with large wagons.

    c. The globe circumnavigates in a day/easily with Pan Am.
    d. *The globe travels in a day/easily with Pan Am.

    e. The enemy battalion infiltrated surprisingly easily for the
        guerrilla soldiers.
    f. *The enemy battalion pursued surprisingly easily for the
        guerrilla soldiers.

Although judgements about middles are notoriously murky, most speakers agree with the relative grammaticalities illustrated here.

The examples above show that 'affectedness' correlates

CAROL TENNY

closely with the aspectual property of delimitedness.[5] It is well-known that affected arguments are always internal arguments, or direct arguments of the verb. This is predicted by a theory in which internal arguments measure out events. Affected arguments are those internal arguments that not only measure out but delimit the event. To summarize, the aspectual constraints on internal arguments give us a means of describing the semantic property of 'affectedness' precisely, and predict that affected arguments should be internal arguments.

4. Unaccusative and unergative verbs

Following the unacusative hypothesis, unaccusative verbs are verbs whose sole argument is an internal argument, while unergative verbs have an external argument as their sole argument.[6] These two classes of verbs constitute a minimal pair with which to investigate the properties of internal and external arguments. The internal or external status of the arguments of unaccusative and unergative verbs is a syntactic fact. However, it is well known that there are strong general semantic tendencies associated with this syntactic distinction. Unergative verbs are usually verbs in which the argument engages in some kind of volitional activity, while unaccusative verbs describe situations in which the argument undergoes some kind of change. Unaccusatives usually assign a patient or theme thematic role, while unergatives more often than not assign agent thematic roles. These familiar facts are illustrated by the following examples:

14 a. unergatives: (external arguments; agent)
       run, dance, whisper, bicycle, study

    b. unaccusatives/ergatives: (internal arguments; patient, theme)
       melt, freeze, evaporate, fall, open

In a model of grammar in which syntax and semantics are strictly autonomous, such a correlation of semantic properties with syntactic structures is difficult to express, yet the semantic

----

5. For more discussion of the correlation of affectedness and delimitedness see Tenny (1987).

6. The unaccusative hypothesis and the representation of unaccusativity in syntactic theory is discussed by Perlmutter and Postal (1984) and Burzio (1986). For contrasting views and problems, see Van Valin (1987) and Zaenen (1987). For a useful overview of issues see Grimshaw (1987).

THE ASPECTUAL INTERFACE HYPOTHESIS

generalizations about these verbs are too strong to ignore. The proposal that the internal argument is constrained to measure out the event provides a simple explanation. There are differing aspectual constraints on internal and external arguments, and these aspectual constraints affect what types of thematic roles may occupy those positions. Applying the adverbial "halfway" brings out a difference between unaccusatives and unergatives:

15 a. *Martha danced halfway.
       *Thomas ate halfway.

    b. The lake froze halfway.
       The candle melted halfway.

"Halfway" applies naturally to the unaccusatives in 15b but not to the unergatives in 15a.[7]

Adverbial phrases such as "a little bit at a time", or "a lot at once" provide additional tests. These are illustrated in 16 and 17.

16 a. The dancer danced slowly/*a little bit at a time.
       The announcer talked slowly/*a little bit at a time.

    b. The candle melted slowly/a little bit at a time.
       The lake froze slowly/a little bit at a time.

17 a. ??Martha danced quickly, a lot of her dancing at once.
       ??The announcer talked quickly, a lot of him talking at once.

    b. The candle melted quickly, a lot of it melting at once.
       The lake froze quickly, a lot of it freezing at once.

These expressions are awkward when used in conjunction with an unergative verb, but quite natural when used with unaccusative verbs.[8]

----

7. There is a special sense of "Martha danced halfway" which is acceptable -- namely that in which Martha dances halfway to some destination. But in this case the property which is measuring out the event (location), although it is changing in the external argument (Martha), can only be expressed in its pure form through an internal argument, as in "Martha danced half the distance (home)."

8. There are some verbs to which these adverbials do not easily apply. Additional tests need to be devised. The reader is

CAROL TENNY

The proposal that the internal argument is constrained to
measure out the event through some property it possesses, while the
external argument is not so constrained, explains the semantic
distribution of verb meanings across unergative and unaccusative
verb classes. Those verb meanings which become unaccusative verbs
describe exactly those event types in which the event participant
may be construed as measuring out the event. Verb meanings in
which the event participant may not be construed as measuring out
the event must become unergative verbs. And finally there will be
a class of verb meanings that may be construed in either way, and
these will be unaccusative in some languages and unergative in
other languages. This is the nature of the correlation that is
attested cross-linguistically.[9] The view advanced here of the
connection between lexical semantics and syntactic argument
structure predicts this. It maintains that there is no absolute
mapping from verb meanings to syntactic argument structure.
Rather, there is a kind of event template associated with argument
structure that acts as a filter on verb meanings.[10]

Van Valin (1987) showed that the aspectual properties of
verbs can be used to determine their class membership in the
unaccustive or unergative verb classes, and that Dowty's aspectual
calculus for lexical decomposition is an effective language for
doing so. The theory proposed here has much in common with Van
Valin's proposal, but it differs in a crucial way. In both
theories there is a mapping from aspectual properties to syntax,
directly or indirectly. But according to Van Valin, the mapping
from aspectual properties of verbs to syntax is constrained only in
that aspectual properties must be statable in a Dowty-style
calculus. These constraints may be language-particular. Under the

----

reminded that the advrbials serve only to elucidate the aspectual
properties of internal arguments. They are not diagnostics.

9. Merlan (1985) examines this question in detail.

10. One might say, taking this view, that there is a mapping from
verb meanings to aspectual structure. However, without a
pre-aspectual theory of verb meanings it would be impossible to
describe this as an absolute mapping. Even with such a theory it
may not be possible, since factors as imprecise as religious or
cultural views may influence what type of aspectual properties
certain kinds of events are perceived by language speakers to
have. It must be emphasized that this theory does not provide the
tools for a perfect and absolute mapping from pre-aspectual verb
meanings to syntactic structures. In a certain sense it preserves
the essential autonomy of syntax and semantics.

THE ASPECTUAL INTERFACE HYPOTHESIS

view advanced here (which adopts the unaccusative hypothesis) the mapping from aspectual properties to syntax is constrained by a universal aspectual event template associated with syntactic argument structure. This view says that certain aspectual properties are in fact syntactic properties.

The aspectual properties of internal and external arguments also provide a reason for the familiar fact that agents are always external arguments. Agents are a type of event participant which are inherently unsuited to measuring out an event on a scale. An agent by its very nature is free to act in unspecified ways to effect something. The actions required of an agent are underspecified and also not necessarily consistent throughout an event, and so are not naturally construable as a scale on which something could be measured. This view suggests that notions such as causation (which is usually associated with agency) are not linguistic notions. Instead, they are extra-linguistic notions that have linguistic consequences mediated by their aspectual properties.

5. The locative alternation

Next consider the locative alternation, investigated in some depth by Rappaport and Levin (1984). The verbs that participate in this alternation have come to be known as the spray/load verbs. These are verbs which take a goal and a theme argument, either of which can be the direct argument of the verb. For example:

18   a. spray paint on the wall
    b. spray the wall with paint

Either the goal, "wall" or the theme, "paint" can be the direct argument of the verb "spray". Only a very particular class of verbs show this alternation. Not all verbs that have a goal and a theme argument can undergo the alternation. The verb "push" also takes a goal and a theme, but the alternation is not possible in 19:

19   a. push a cart to San Francisco
    b. *push San Francisco with a cart

The possibility of the locative alternation seems to depend on a very narrow semantic property; the goal must be a flat surface or container, and the theme must be a material which is removed or applied to that surface or container. The spray/load verbs in 20 illustrate these properties:

CAROL TENNY

20   a. load hay on the wagon
     b. load the wagon with hay

     c. clear dishes from the table
     d. clear the table of dishes

     e. cram pencils into the jar
     f. cram the jar with pencils

Furthermore, this generalization holds across a wide variety of unrelated languages. 21 and 22 illustrate the alternation in Dutch and Japanese:

21   Dutch:
     a. Jan plant bomen in de tuin.
        John plants trees in the garden.

     b. Jan be-plant de tuin   met bomen.
        John be-plants the garden with trees.
                          (De Groot(1984), his source Dik (1980))

22   Japanese:
     a. kabe ni penki o   nuru
        wall on paint-ACC paint(VERB)
        smear paint on the wall

     b. kabe o   penki de   nuru
        wall ACC paint-with paint(VERB)
        smear the wall with paint
                    (Fukui, Miyagawa, Tenny (1985))

The locative alternation is an alternation in syntactic argument structure that depends on certain characteristics of the theme and the goal. We must ask why such seemingly trivial semantic properties should have syntactic repercussions such as these, especially since we know syntax and semantics to be autonomous to such a large extent. The proposal that the direct internal argument is constrained to measure out the event described by the verb provides a simple explanation. Spray/load verbs describe exactly those events in which the goal may be construed as measuring out the event. If you apply some material to a flat surface, or fill a container with something, then the material spreads out across the surface or rises up to the top of the container in a consistent and uniform way, and in so doing may be seen to 'measure out' the event.

    The aspectual constraints on internal arguments predict certain other familiar facts about the locative alternation. Consider 23 below:

502

THE ASPECTUAL INTERFACE HYPOTHESIS

23   a. spray the paint in the hole
     b. spray the hole with paint

23a means that the paint is directed into the hole but not
necessarily spread around on the surface or wall of the hole. 23b,
however, is not an accurate paraphrase of 23a because it means that
the paint is spread around on the surface or wall of the hole.
This is because when the goal, "the hole", is the direct argument
of the verb it is constrained to 'measure out' the event.

The locative alternation is impossible when an instrument
thematic role is substituted for the material thematic role. Both
material and instrument are possible as indirect objects:

24   a. spray the wall with water
     b. spray the wall with a hose

But only the material can be a direct argument:

25   a. spray water on the wall
     b. *spray a hose on the wall

This is because a material is consumed a little at a time until it
is gone, thus 'measuring out' the event, but an instrument is
unchanged throughout the event and so cannot be construed as
'measuring out' the event. In this case it is precisely the
aspectual properties of the material and instrument thematic roles
which determine how they are mapped into the syntax.

Finally, this approach to spray/load verbs can be extended to
verbs that take 'path' arguments. For example:

25   a. walk the bridge
     b. walk across the bridge
     c. walk to the bridge

In 25a "the bridge" is a path argument which 'measures out' the
event by virtue of being the verb's direct argument. Although both
25b and 25c are acceptable expressions, only 25b may be a
paraphrase of 25a. In 25a and 25b the walking event is understood
to traverse the bridge, so that a certain amount of bridge
correlates with a certain amount of walking. The bridge measures
out the walking.

CAROL TENNY

Under this view, it is the aspectual properties of thematic roles that are relevant for syntactic argument structure. The aspectual differences between materials and instruments, and the aspectual properties of certain types of goals, are what make the locative alternation possible or impossible.[11]

6. Psych verbs

Next consider psych verbs. These are verbs that have an argument bearing an experiencer thematic role. In the sentences below, "John" is an experiencer. The experiencer is an internal argument in 26a and an external argument in 26b:

26 a. John fears ghosts.
    b. Ghosts frighten John.

Psych verbs present interesting minimal pairs in which similar (or identical) verbs assign the same thematic role -- experiencer -- to the internal or external argument position. At first glance there seems to be no difference in meaning between the members of a pair like "fear and "frighten". However, there is an important difference in meaning between verbs with internal argument exeriencers and external argument exeriencers, and this is the difference predicted by an aspectual theory of argument structure. When the experiencer is an internal argument it measures out the event, and when it is an external argument it does not. This can be illustrated by adding delimiting expressions to the sentence:

27 a. The children feared the movie to the end.
    b. *The movie frightened the children to the end.

28 a. *The children feared the movie to death.
    b. The movie frightened the children to death.

The delimiting expressions in 27 and 28 ("to the end" and "to death"), are actually resultative secondary predicates. They refer to the central property of the internal argument which is changing and measuring out the event. They delimit the event by picking out

----

11. These are possibilities allowed by a universal semantics. Language-particular lexicalization may allow only a subset of these universal possibilities.

THE ASPECTUAL INTERFACE HYPOTHESIS

some point in that ongoing change at which the event terminates.[12] When the experiencer is the external argument, the event may not be delimited by referring to a property of that experiencer (27b, 28a). When it is an internal argument, it is quite natural to do so (27a, 28b).

The aspectual constraints on internal arguments provide an explanation for the familiar fact that secondary resultative predicates may refer to the object but not the subject of the sentence. Resultatives are syntactic constructions that depend on the aspectual structure built up by the verb and its direct argument. Since the external argument is excluded from this aspectual structure, resultatives may not be predicated of external arguments. Consistent with this is the fact that a resultative secondary predicate is constrained not just to refer to the object but to refer to the property of the object that is measuring out the event. The resultative and the internal argument must agree on what property that is. If the delimiting expression in 28b is changed to a locational goal phrase, the sentence is bad unless it can be interpreted as expressing motion (i.e., change in location):

29   The movie frightened the children to Ohio.

29 is incoherent if it is the children's becoming afraid that measures out the event. But it is a good sentence if it is the children's changing in location that measures out the event. In the latter case the sentence would be understood to mean that the movie made the children go to Ohio by frightening them.

The case of these psych-verb pairs is particularly telling for a number of reasons. First of all, the thematic role of the arguments in internal and external position is exactly the same. The aspectual difference between "fear and "frighten" cannot be traced to differences in thematic structure. They derive only from the difference in syntactic structure.

Secondly, the object-orientation of resultatives is a syntactic fact of great generality. The connection of this fact with the aspectual properties of internal arguments underscores the idea that these properties are syntactically rather than thematically based. The tight connection between aspect and syntax suggests that we may expect to find further repercussions in syntax, of the aspectual properties of syntactic argument structure. And conversely, aspect may be used as a tool in

----

12. The expression "to death" does so metaphorically if not literally.

CAROL TENNY

syntactic investigations.[13]

Finally, psych verbs have posed a problem for theories that tightly constrain the mapping of lexical semantics into syntax, because there seems to be no difference in meaning between comparable verbs with experiencers in internal and external argument position. However, there is a difference in meaning that follows from the different aspectual roles of the experiencer in internal and external argument position. The thematic role of experiencer happens to be adaptable to either of the aspectual representations of internal or external argument-hood. In other words, the mapping of lexical semantics into syntax may be tightly constrained only if it is based on aspectual properties, rather than on thematic roles.

7. Conclusion

This paper has argued that aspectual properties associated with syntactic argument positions, and particularly with the internal argument, constrain the mapping of lexical semantics into syntax. This theory amounts to a proposal for a tight connection between lexical semantics, or verb meaning, and syntactic argument structure. The idea that there are aspectual correlates of syntactic argument sructure entails an explicit hook-up between semantics and syntax. However, it must be noted that this hook-up preserves the essential autonomy of syntax and semantics. Although certain aspectual properties are claimed to be uniformly and universally associated with syntactic properties, the connection between these aspectual/syntactic properties and pre-aspectual verb meanings is not highly constrained. The aspectual/syntactic structures act as a kind of loose filter on event types. This theory says nothing about the connection between event types and the aspectual properties they may or may not be imbued with. The precise characterization of this connection, if there is one, may be beyond the scope of linguistic theory.

Much work remains to be done to make this theory more explicit and give it more predictive power. For one thing, the idea that internal arguments must measure out events applies only to verbs that describe some kind of event or change. It excludes pure statives (which presumably have a simpler account) and verbs taking propositional arguments of all kinds (which presumably have a more complicated explanation). Constraints on stative verbs may be subsumable under some special case of this theory. But the theory has no account of propositional argument verbs. Secondly, under this theory the aspectual constraints on verbs of change must

----

13. See Tenny (1987) for further discussion of this point.

THE ASPECTUAL INTERFACE HYPOTHESIS

extend to all internal arguments of all such verbs. It is necessary to examine verbs that do not wear this aspectual structure on their sleeves, so to speak, in order to ascertain whether they constitute real counterexamples. Nevertheless, the idea that some property of the internal argument of the verb is constrained to measure out the event does do several things. It gives us the tools for a precise characterization of affectedness and explains why affected arguments are internal arguments; explains the semantic distribution of unaccusative and unergative verbs; explains why agents must be external arguments; explains the distribution of the locative alternation; elucidates a difference in meaning between the two types of psych verbs; explains why resultative secondary predicates refer to objects and not to subjects; and provides an explicit theory of the interaction of lexical semantics and syntactic argument structure. This is an encouraging beginning.

Three final points must be noted. First, this aspectual theory of argument structure introduces an unusual view of aspect. Aspectual properties have usually been associated with predicates and predicative expressions, such as verbs, verb phrases, or clauses. But with this approach, we can also talk about the aspectual properties of arguments and noun phrases.

Secondly, the aspectual theory of argument strucutre introduces a fundamental semantic asymmetry paralleling the familiar syntactic asymmetry between internal and external arguments. In a sense, this is actually quite a conservative proposal.

Finally, the theory makes strong predictions about possible and impossible verbs. If the theory is correct, verbs that violate the aspectual principles of argument structure should not exist and should not be learnable. This thesis may be testable in language aquisition experiments. The aspectual theory of argument structure has implications for cognitive science in general, because it claims that predicates of natural language characterize events in a very particular and highly constrained way.

REFERENCES

Anderson, M. (1979) "Noun Phrase Structure", Ph.D dissertation, University of Connecticut.

Burzio, L. (1986), Italian Syntax, A Government and Binding Approach, Dordrecht: Reidel.

CAROL TENNY

De Groot, C. (1984), "Totally affected. Aspect and three-place
    predicates in Hungarian", in C. de Groot and H. Tommola,
    eds., Aspect Bound. A voyage into the realm of Germanic,
    Slavonic and Finno-Ugrian aspectology, Dordrecht: Foris.
    pp 133-151.

Dik C. (1980), Studies in Functional Grammar, London and New
    York: Academic Press.

Dowty, D. (1979), Word Meaning and Montague Grammar,
    Dordrecht: Reidel.

Fukui N., Miyagawa S., and Tenny C. (1985), "Verb Classes in English
    and Japanese: A Case Study in the Interaction of Syntax,
    Morphology and Semantics", Lexicon Project Working Papers #3,
    Cambridge, MA: MIT Center for Cognitive Science.

Grimshaw, J. (1987), "Unaccusatives -- An Overview", Paper
    presented at NELS 17, published in Proceedings of NELS 17,
    Amherst: U Mass GLSA.

Gruber, J.S. (1965) "Studies in Lexical Relations", Ph.D.
    dissertation, MIT; in Gruber, J.S. (1976), Lexical Structures in
    Syntax and Semantics, Amsterdam: North Holland.

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

Hinrichs, E. (1985), "A Compositional Semantics for
    Aktionsarten and NP Reference in English", Ph.D dissertation,
    Ohio State University.

Jackendoff, R. (1972), Semantic Interpretation in Generative
    Grammar, Cambridge, MA: MIT Press.

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

Jackendoff, R. (1986), "Parts and Boundaries", talk delivered at MIT
    Lexicon Seminar.

Merlan, F. (1985), "Split intransitivity: functional oppositions
    in intransitive inflection", in J. Nichols and A. Woodbury,
    eds., Grammar inside and outside the clause: Some
    approaches to theory from the field, Cambridge:
    Cambridge University Press, pp. 324-362.

Perlmutter, D. and Postal, P. (1984), "The 1-Advancement
    Exclusiveness Law", in Perlmutter, D. and Rosen, C. (eds.),

THE ASPECTUAL INTERFACE HYPOTHESIS

Studies in Relational Grammar 2, Chicago: University of Chicago Press. pp. 81-125.

Pustejovsky. J. (1987), "The Geometry of Events: A Theory of Aspect Structure", talk delivered at MIT Lexicon Seminar.

Roberts, I. (1985), "The Representation of Implicit and Dethematized Subjects", Ph.D. dissertation, University of Southern California.

Tenny, C. (1987), "Grammaticalizing Aspect and Affectedness", Ph.D. dissertation, MIT.

Van Valin, R. (1987), "The Unaccusative Hypothesis vs. Lexical Semantics: Syntactic vs. Semantic Apporaches to Verb Classification", Paper presented at NELS 17, published in Proceedings of NELS 17, Amherst: U Mass GLSA.

Vendler, Z. (1967), "Verbs and Times", In Z. Vendler, Linguistics in Philosophy, Ithaca, New York: Cornell University Press.

Verkuyl, H.J. (1972) On the Compositional Nature of the Aspects, Dordrecht: Reidel.

Verkuyl, H.J. (1976), "Interpretive Rules and the Description of the Aspects", Foundations of Language 14, Dordrecht: Reidel. pp. 471-503.

Verkuyl, H.J. (1978), "Thematic Relations and the Semantic Representation of Verbs Expressing Change", in Studies in Language 2, pp. 199-233.

Verkuyl, H.J. (1987a), "Nondurative Closure of Events", in J.A.G. Groenendijk, D. de Jongh, and M.J.B Stokhof (eds.), Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers, Proceedings of the 5th Amsterdam Colloquium (1984), Dordrecht: Foris Publications.

Verkuyl, H.J. (1987b), "Aspectual Asymmetry and Quantification", to appear in V. Ehrich & H. Vater (eds.), Temporalitat, (Proceedings of the Heidelberg Workshop on Tense and Aspect, Feb. 1986)

Zaenen, A. (1987), "Are there unaccusative verbs in Dutch?", Paper presented at NELS 17, published in Proceedings of NELS 17, Amherst: U Mass GLSA.