On the Interface Approach to Unaccusativity

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1. Introduction

Since the Unaccusative Hypothesis was proposed by Perlmutter (1978), many researchers have worked on unaccusativity in different frameworks. These studies can be categorized into three different types of approaches according to the method of treating this phenomenon. The three approaches are: the purely syntactic approach (Burzio 1986; Kayne 1993), the purely semantic approach (Van Valin 1990; Dowty 1991) and the interface approach (Levin and Rappaport Hovav 1995; Sorace 2000). My previous paper reviewed first two types of approaches: the purely syntactic approach and the purely semantic approach, and examined each claim. The current paper takes up the third type of approach: the interface approach. The interface approach treats unaccusativity as a phenomenon which is associated with the domains of both syntax and semantics. A number of theories which take up this position have been presented. These theories are comparable in that they attempt to account for the correlation between syntax and semantics in a systematic manner, but differ considerably in their details.

In this paper, five theories by different scholars (Levin and Rappaport Hovav 1995; Sorace 2000; McClure 1995; Borer 1994; van Hout 1994, 1996) will be reviewed, which can be mainly categorised into two different approaches: the lexical semantic approach and the predicate-based approach. Levin and Rappaport Hovav (1995) and

Sorace (2000) are examples of the former, while McClure (1995),
Borer (1994), and van Hout (1994, 1996) count among the latter.
These theories differ in many respects, but the main differences can
be characterised as two sets of parameters, presented by Benua and
Borer (1996), and defined as follows by Arad (1996):

(1) (i) **Lexical-entry driven approaches vs. predicate-based ap-
   proaches:**   lexical- entry driven approaches assume that the
   syntax of verbs is projected from their lexical entries, and is
   determined by them. Lexical entries should therefore contain all
   the information (thematic or aspectual) needed for projecting
   verbs' syntax correctly (see, for example, Chomsky's 1986 Ca-
   nonical Structure Realization, Baker's 1988 Uniformity of Theta
   Assignment Hypothesis (UTAH), Tenny's 1992, 1994 Aspectual
   Interface Hypothesis, Pesetsky 1995, Levin and Rappaport
   Hovav 1995, Carrier and Randall 1993, Larson 1988, Grimshaw
   1990). Predicate-based approaches, on the other hand, assume
   that at least part of the interpretation of individual arguments
   in the clause depends on the syntax of the entire predicate,
   rather than on specification of lexical entries (see Hoekstra and
   Mulder 1990, Borer 1994, van Hout 1996).

   (ii) **Thematically-based approaches vs. event structure-
   based approaches:** in thematically-based approaches, arguments
   are licensed by being assigned a thematic role by the verb. The
   set of thematic roles differs slightly according to the theory,
   but it generally includes Agent, Causer, Experiencer, Theme,
   Goal, Source, etc. All traditional approaches within GB belong
   to this type. In event structure-based approaches, the lexical in-
   formation available at the interface is the event structure of

the verb. The verb assigns aspectual roles (Tenny 1992, 1994), or specifies event participants (van Hout 1996), rather than assigning thematic roles.

(Arad 1996: 215-216)

Based on these parameters, each of the five theories can be illustrated as in Table 1:

Table 1 : The categorisation of the theories based on the interface approach

	Thematically-based	**Event structure-based**
Lexical-entry driven	Levin and Rappaport-Hovav (1995) Sorace (2000)	
Predicate-based		McClure (1995) Borer (1994) van Hout (1994, 1996)

Table 1 shows a clear difference between the theories based on the lexical-entry driven approach and those based on the predicate based approach. We shall start with Levin and Rappaport Hovav's lexical-entry driven approach.

2. The lexical-entry driven approach

2.1 Levin and Rappaport Hovav (1995)

Based on Perlmutter's hypothesis that "unaccusative is syntactically represented but semantically determined", Levin and Rappaport Hovav (1995) examine which semantic classes of intransitive verbs are syntactically encoded as unaccusatives. Firstly, Levin and Rappaport Hovav discuss the validity of three possible diagnostic tests for unaccusativity in English: the resultative construction, the causative

alternation, and the locative construction. They present the first and the second diagnostic tests as a test of *deep* unaccusativity, and the third one as a test of *surface* unaccusativity. Let us have a brief review for each diagnostic test here.

a. The resultative construction

Levin and Rappaport Hovav (1995) introduce the resultative construction as a test of deep unaccusativity. Consider the following examples.

(2) a. He broke the vase into pieces.

b. The vase broke into pieces.

(3) a. John painted the car red.

b. The car was painted red.

(4) a.* He broke the vase tired.

b.* John painted the car tired.

Simpson (1983) notes that a resultative phrase may only modify an internal argument of the verb. In (2), the resultative phrase "into pieces" modifies the internal argument "the vase". In the same way, (3a) means "he painted the car, as a result the car became red". However, in (4a) and (4b), the resultative phrase "tired"cannot modify the external argument of the verb "he", "John", in other words, it cannot be interpreted as being predicated of the subject. Similarly, the resultative phrase cannot modify the subject of simple intransitive verbs which have no internal argument, as shown in (5).

(5)　a.* John ran tired.

　　b.* John laughed tired.

　　c.* John danced tired.

To summarise according to McClure (1995: 9),

(6)　Resultative (English)

　　a. Direct object

　　　I painted the car red (=red car)

　　b. Passive subject

　　　The dog was washed clean (=clean dog)

　　c. Unaccusative subject

　　　The juce has frozen solid (=solid juce)

b. The causative alternation

There has been wide awareness that the causative alternation is associated with the unaccusative/unergative distinction. The causative alternation is claimed to be a valid unaccusative diagnostic test (Burzio 1986, C. Rosen 1981, among others), which is shown by the following examples:

(7)　Unaccusative

　　a. Pat broke the window./The window broke.

　　b. Antonia opened the door./The door opened.

　　c. Tracy sank the ship./The ship sank.

(8)　Unergative

　　a. The children played./*The teacher played the children.

　　　(cf. The teacher made the children play)

    b. The actor spoke/*The director spoke the actor.

      (cf. The director made the actor speak)

  c. The crowd laughed./*The comedian laughed the crowd.

      (cf. The comedian made the crowd laughed)

                  (Levin and Rappaport Hovav 1995: 79-80)

Levin and Rappaport Hovav (1995), however, claim that the causative alternation does not apply to all the unaccusative verbs, and present some counterevidence, involving verbs of existence and appearance.

(9) a. A star appear in the sky./*The darkness appeared a star in the sky.

    b. An explosion occurred./*The gas leak occurred an explosion.

    c. A solution exists./*The mathematician existed a solution.

                  (Levin and Rappaport Hovav 1995: 122)

Thus, Levin and Rappaport Hovav (1995) do not regard the causative alternation as a valid diagnositic test for unaccusativity, because not all unaccusative verbs are attested in the alternation.

c. Locative inversion

    It has been acknowledged that locative inversion is a diagnostic test for surface unaccusativity (Bresnan and Kanerva 1989, Coopmans 1989, L. Levin 1986, among others), which is shown by the following examples:

(10) Unergative

    a. Many students talk in the library.

    b. *In the library talk many students.

(11) Unaccusative

    a. The head of Jenny's mother appeared over her shoulder.

    b. Over her shoulder APPEARED the head of Jenny's mother. [M. Spark, The Prime of Miss Jean Brodie 27]

                    (Levin and Rappaport Hovav 1995: 220)

Levin and Rappaport Hovav, however, raise two points. Firsly, not all unaccusative verbs are attested in the locative inversion construction, but only some cases of unaccusative verbs fit naturally with it: verbs of apperance and existence as in (11), while unaccusative verbs of change of state are not found in it, for example,

(12) a. *On the top floor of the skyscraper BROKE many windows.

      b. *On the streets of Chicago MELTED a lot of snow.

      c. *On the backyard clotheslines DRIED the weekly washing.

                    (Levin and Rappaport Hovav 1995: 224)

Secondly, Levin and Rappaport Hovav point out that some unergative verbs can also be used with locative inversion. Look at the following examples:

(13) a. Opposite the landing-place stood half a dozen donkeys with saddles on their backs and bunches of flowers in their brideles, and around them CHATTERED and SANG as many girls with the silver spadella stuck through their black tresses and a red handkerchief tied across their shoulders   [A. Munthe, The Story of Sam Mitchele, 1]

      b. On the third floor WORKED two young women called Maryanne Thomson and Ava Brent, who ran the audio

library and print room.

[L. Colwin, *Goodbye without Leaving.* 54]

c. Behind the wheel LOUNGED a man uniformed with distinct nautical flavour.

[A.W. Upfield, *The Windows of Bloome*, 109]

d. At one end, in crude bunks, SLEPT Jed and Henry···

[L. Broomfield, *The Farm*, 18]

e. He thought of the free-form pool behind the bougainvillea hedge there clogged with rafts of Styrofoam on which DOZED naked oily bathers lying on their backs wide open to that sun.   [A. Marshall, *The Brass Bed*, 228]

(Levin and Rappaport Hovav 1995: 224)

They explain that this is because the locative inversion requires the verb to fulfil a discourse function as "informationally light", and some unergative verbs can satisfy this requirement as shown in (13). To sum up Levin and Rappaport Hovav's view on these diagnostic tests, they argue that only the resultative construction has validity as a diagnostic test while the causative alternation and the locative inversion construction do not. The results from their analysis are summarised as follows:

(14) **Syntactically unaccusative in English:**

(i) externally caused verbs (*break, open, sink*)
        (e.g. *The window broke, The ship sank*).

(ii) verbs of inherently directed motion (*arrive, come, leave*)
        (e.g. *We arrived at the hotel, He came to my house*)

(iii) verbs of existence and appearance (*appear, remain, exist*)
        (e.g. *A man appeared in the doorway, This kind of bird exists only in Scotland*)

(15) **Syntactically unergative in English:**

(i) internally caused verbs (*laugh, smile, joke, travel*)

(e.g. *The children laughed, She smiled*)

(ii) verbs of emission (ex. *wheeze, flash, shine, sparkle*)

(e.g. *The jewels sparkled, Her eyes shone*)

(iii) verbs of spatial configuration in their 'maintain position' sense (*sit, stand, lean*).

(e.g. *The statue stands in the park, My house sits at the foot of the hill*)

There are a number of verbs which do not fall within any of the semantic classes above. These verbs exhibit a shift between unaccusative and unergative depending on the non-agentive and the agentive use:

(16) (i) internally caused verbs of change of state (*bloom, flourish, decay*)

(e.g. *The cherry blossoms bloom, The logs decayed*)

(ii) some non-agentive manner of motion verbs (*roll, spin, bounce*)

(e.g. *The ball bounced, The ball rolled*)

Levin and Rappaport Hovav formulate four main linking rules to explain how the lexical syntactic representation is derived from its lexical semantic representation —the Immediate Cause Linking Rule, the Directed Change Linking Rule, the Existence Linking Rule, and the Default Linking Rule. The linking rules determine how the lexical-semantic specifications are mapped onto argument structure positions like "external argument" and "direct internal argument"[1]. These argument structures are projected into syntactic configuration by the Projection Principles. Consequently, linking rules are responsible for

creating the lexical syntactic representation from its lexical semantic representation. The interface between semantic representation and the syntactic representation can be illustrated as follows:
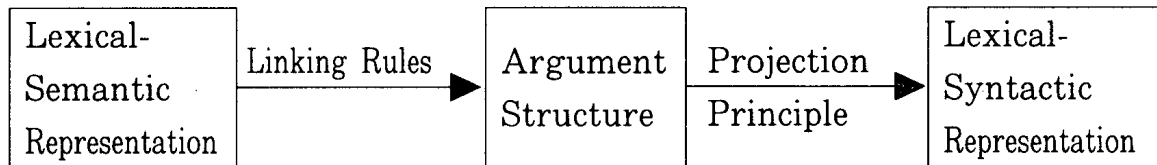
| Lexical-Semantic Representation | Linking Rules → | Argument Structure | Projection Principle → | Lexical-Syntactic Representation |

Figure 1 : The interface Model

Let us start with the Immediate Cause Linking Rule.

2.1.1 The immediate Cause Linking Rule

(17) **Immediate Cause Linking Rule**

The argument of a verb that denotes the immediate cause of the eventuality described by that verb is its external argument.

Levin and Rappaport Hovav point out that the best notion to distinguish between the intransitive verbs which have transitive causative uses (ex. *break, open*), and the ones which do not (ex. *laugh, speak*), is that of internal versus external causation. The Immediate Cause Linking Rule is devised to apply to both internally and externally caused verbs. It is responsible for the mapping of the external argument, specifying that the immediate cause will be projected into the external argument position. Look at the following examples:

(18)   a. Pat broke the window.
       b. The window broke.

(Levin and Rappaport Hovav 1995: 79)

(19) a. The crowd laughed.

    b. *The comedian laughed the crowd.

<div align="right">(Levin and Rappaport Hovav 1995: 80)</div>

The terminology, "immediate cause" used in the rule refers to participants like "Pat", "the crowd" in (18), and (19), respectively, which is the entity responsible for bringing about the eventuality. Since verbs like "break" denote external causation, where immediate cause and *theme* are necessarily different, they allow transitive causative uses, whereas verbs like "laugh" describe internally caused eventualities, where immediate cause and *theme* are the same, so they do not have transitive causative uses as (19b). This leads to the fact that internally caused verbs are basically monadic, and externally caused verbs are basically dyadic no matter which framework they are embedded in.

The Immediate Cause Linking Rule also explains why "verbs of emission" displays different syntactic behaviour in the causative alternation depending on context, as seen in (20) and (21).

(20) a. The doorbell buzzed.

    b. The postman buzzed the doorbell.

(21) a. The bees buzzed.

    b. *The postman buzzed the bees.

<div align="right">(Levin and Lappaport Hovav 1995: 117)</div>

For the internally caused use of "buzz" in (20a), (21a), there is no problem in conceptualising both entities as emitting the sound. However, for the externally caused use of "buzz", (21b) is not allowed, because bees emit the sound under their own control, and nobody can

make them emit the sound under manipulation. As a result, it is impossible to have a transitive causative use in this context.

2.1.2 The Directed Change Linking Rule

(22) **Directed Change Linking Rule**

The argument of a verb that corresponds to the entity undergoing the directed change described by that verb is its direct internal argument.

The Directed Change Linking Rule is formulated for verbs of change of state and verbs of inherently directed motion, in order to specify that each of the passive participants such as "patient", "theme" will be mapped onto the direct internal argument position as seen in (23) and (24).

(23) a. The boy broke the window.
      b. The window broke.

(24) a. Mike opened the door.
      b. The door opened.

In English, a subject is obligatory at S-structure, and as a result of the application of syntactic principles like the Case Filter, Burzio's Generalisation, and the Projection Principle, the direct internal argument moves into subject position at S-structure. The crucial characteristic of those verbs which the Directed Change Linking Rule applies to is "directed". Verbs which denote a "manner of motion" but not a "direction" like *walk, swim,* and *bounce* are excluded for the scope of the Directed Change Linking Rule, and fall under the

Immediate Cause Linking Rule, though they inherently entail a sort of change of location.

2.1.3 The Existence Linking Rule

(25) **Existence Linking Rule**

The argument of a verb whose existence is asserted or denied is its direct internal argument.

The Existence Linking Rule is specially formulated for verbs of existence and appearance. Look at the examples.

(26) a. A star appeared in the sky.

b. A solution exists.

(Levin and Rappaport Hovav 1995: 122)

These classes of verbs are syntactically encoded as unaccusative due to their behaviour as seen in "*there*-insertion" as shown in (27), but they lack an external cause parallel to those internally caused verbs classified as unergative.

(27) a. There appeared a ship on the horizon.

b. There exists a solution to that problem.

(Levin and Rappaport Hovav 1995: 121)

Levin and Rappaport Hovav (1995) conclude that the notion of internal versus external causation is not suitable for this class of verbs, and establish a special linking rule for their classification.

2.1.4 The Default Linking Rule

(28) Default Linking Rule

An argument of a verb that does not fall under the scope of any of the other linking rules is its direct internal argument.

The Default Linking Rule is created for monadic verbs which the other three linking rules do not account for. Levin and Rappaport Hovav assume that this rule will apply to a part of the verbs of manner of motion, which are usually non-agentive, such as *bounce, roll,* and *spin*. They take the *roll* verbs as an examples, and explain that the Directed Change Linking Rule cannot be applied to the *roll* verbs when they are used as an externally caused verb, because they are not directed. In such cases, the Default Linking Rule is applied to the verbs.

2.1.5 The Order of Priority among the Linking Rules

Levin and Rappaport Hovav (1995) admit that there still remain some questions about the rules such as whether they are all necessary or if there is any order of priority among them. In fact, there are some cases where one identical verb can be subject to two different linking rules. For example, the internally caused verbs of "directed change" fall under not only "the Directed Change Linking Rule", but also "the Immediate Cause Linking Rules". As a solution to maintain consistency in the syntactic behaviour of unaccusativity in English, Levin and Rappaport Hovav set up a priority rule which states that the Directed Change Linking Rule takes precedence over the Immediate Cause Linking Rule. Similarly, verbs of existence are subject to both of the rules, the Immediate Cause Linking Rule and the Existence Linking Rule. Levin and Rappaport Hovav posit a rule here as

well, which states that the Existence Linking Rule takes precedence over the Immediate Cause Linking Rule. Thus both the Existence Linking Rule and the Directed Change Linking Rule take precedence over the Immediate Caused Linking Rule. However, Levin and Rappaport Hovav do give an order of priority between the Directed Change Linking Rule and the Existence Linking Rule.

2.1.6 Some criticisms of Levin and Rappaport Hovav (1995) by Sorace (2000)

a. Linking rules

Contrary to the claim of Levin and Rappaport Hovav (1995), Sorace (2000) argues that the four linking rules do not have equal importance, and they are not all equally necessary. Her criticism of the linking rules presented by Levin and Rappaport Hovav is mainly focused on the following two points:

(29) a. The lack of explanation for the basis of the order of priority.

  b. The necessity of two rules, which overlap in classes of verbs such as verbs of appearance: the Directed Change Role and the Existence Rule.

With respect to the first point, Sorace shows that there are exceptions in several languages, which the Directed Change and Existence Linking Rules do not apply to. Look at the following examples.

(30) a. Il poeta Omero è/*ha realmente esistito

  b. De dichter Homerus *is /heeft echt bestaan

  c. Le poète Homère *est/a reellement existé

    d. Der Dichter Homer *ist/hat wirklich existiert
       The poet Homer is/has really existed
       The poet Homer really existed

<div align="right">(Sorace 1998: 9)</div>

As observed in the Italian example (30a), the Existence Linking Rule applies to a verb of existence and ensures its unaccusative status, but in Dutch (30b), French (30c), or German (30d), this type of verb is not unaccusative but unergative, because the arguments of verbs denoting "existence" are mapped not onto internal arguments but onto external arguments.

The second point raises the question about whether the Directed Change Rule and the Existence Rule are both necessary, even if they overlap with verbs of appearance. Along with this question, the necessity of a Default Linking Rule is cast into doubt as well; Sorace claims that if Levin and Rappaport Hovav employed the notion of "telicity", the unergative/unaccusative shift displayed in verbs such as *run* and *roll* could be explained without postulating a distinct Default Linking Rule, because these verbs show sensitivity to the telicity of the predicate as unaccusative, which is contrary to Levin and Rappaport Hovav's view on these verbs' behaviour as unsystematic. Look at the Italian examples.

(31) a. Maria   ha   corso   velocemente
         Maria   has   run   quickly
         'Maria ran quickly'
      b. Maria   è   corsa   a   casa
         Maria   is   run   to—home
         'Maria ran home'

(32) a. La palla ha rotolato velocemente
        The ball has rolled quickly
        'The ball rolled quickly'

    b. La palla è rotolata nel fossato
        The ball is rolled in-the ditch
        'The ball rolled into the ditch'

(Sorace 1998: 10)

As shown in (31a) and (32a), verbs such as *run* and *roll* are in atelic predicates which take the auxiliary *avere*, while once a directional phrase is attached, they display unaccusative status taking the auxiliary *essere*. This also applies to Dutch as seen in (33) and (34).

(33) a. Anneke heft in een opera gedanst
        A.   has in an opera danced
        'A. danced in an opera'

    b. Anneke is van het podium of gedanst
        A.   is of the stage off danced
        'A. danced off the stage'

(34) a. De tennisbal heft over de baan gerold
        the tennis-ball has over the court rolled
        'The tennis ball rolled over the court'

    b. De tennisbal is de baan op gerold
        the tennis-ball is the court onto rolled
        'The tennis ball rolled onto the court.'

(van Hout 1996: 63)

b. Semantic factors

    Sorace (2000) carefully examines three semantic factors which are

given by Levin and Rappaport Hovav as the relevant components for split intransitivity: *internal causation, directed change*, and *appearance/existence*, as well as scrutinising the notions of *agentivity, telicity*, and *stativity*, which are regarded as irrelevant by Levin and Rappaport Hovav. Comparing the components of agentivity and internal causation, telicity and directed change, Sorace points out that in both components, Levin and Rappaport Hovav have a too broad notion in each pair. More concretely, internal causation encompasses the notion of agentivity, which means that internally caused verbs are not necessarily agentive. To take verbs of emission an example, *shine, flash* are internally caused but they are not agentive.

With respect to telicity, Sorace provides a similar criticism. The component of directed change encompasses that of telicity, therefore telicity always implies a directed change, but not vice versa. Sorace gives the examples of the verbs, *rise* and *cool*, which denote directed change, but not definite end-points.

Finally, Sorace posits a different view of stativity from that of Levin and Rappaport Hovav's — suppose stativity were a determinant of unaccusativity, there should not exist classes of unergative stative verbs such as verbs of emission, and the classes of unaccusative activity verbs such as verbs of spatial configuration in the maintain-position sense as shown in (35a) and (35b), respectively.

(35)   a. The headlight flashed.
       b. The computer sits on the desk.

Sorace makes the point that these two classes are both 'stative', but this does not mean they are stative in the same sense. She describes these verb classes that emission verbs as activity verbs which denote continuous events. In contrast, maintain-position verbs denote

the continuation of a pre-existing state, and their lexical semantics includes a stative component, which differentiates them from activity verbs.

c. Diagnostics

Recall that Levin and Rappaport Hovav introduce two potential diagnostic tests for unaccusativity in English: the resultative construction and the locative inversion construction (see section 2.1 for details).

(36)   resultative construction

a. *John ran tired (unergative)

b. The vase broke into pieces (unaccusative)

(37)   locative inversion

a. Over her shoulder APPEARED the head of Jenny's mother. [M. Spark, The Prime of Miss Jean Brodie 27]

(Levin and Rappaport Hovav 1995: 220)

b. *In the cafes of Paris TALK many artists.

(Levin and Rappaport Hovav 1995: 222)

They present the former as a test of deep unaccusativity, and the latter as a test of surface unaccusativity. Having examined each diagnostic, they make the claim that the resultative construction has validity as a diagnostic test, while the locative inversion construction does not. As the main reasons for the lack of invalidity of the locative inversion, Levin and Rappaport Hovav raises two points. Firstly, not all unaccusative verbs are attested in the locative inversion construction, but only some classes of unaccusative verbs fit naturally with it: verbs of appearance and existence, while unaccusative verbs of

change of state are not found in it. Secondly, some unergative verbs
can also fit into the locative inversion. They explain that this is be-
cause the locative inversion requires the verb to fulfil a discourse
function as "informationally light", and some unergative verbs can
satisfy this requirement, like verbs of appearance and existence.

2.2 Sorace (2000)

As referred to in the introduction, Sorace (2000) is also based on
the lexical-entry driven approach. However, what distinguishes
Sorace's view from Levin and Rappaport Hovav's is that she does not
deny the idea proposed in predicate-based approaches — unaccusativity
can be compositional. Sorace's claim is that unaccusativity at its *core*
is lexical, which is evidenced by the fact that core unaccusative verbs
do not exhibit the syntactic shift between unaccusative/unergative
even when they are embedded in an atelic predicate. Look at the fol-
lowing examples:

(38) Italian core verb
     a. Si è appena arrivati
       SI is just arrived (pl)
      "We have just arrived"   (Burzio 1986: 55)
     b. Sono arrivati ospiti per ore e ore
       are arrived guests for hours and hours
      "Guests arrived for hours"

                                   (Sorace 2000: 864)

(39) German core verb
     a. Ich bin gerade im Hotel angekommen
       I am just at the hotel arrived
      "I have just arrived at hotel"

      b. Gäste   siud   stundenlang   angekommen

         guests   are   hours long   arrived

       "Guests arrived for hours"

In contrast, non-core unaccusative and unergative verbs are sensitive to the aspectual characteristics of the predicate, and more likely to participate in such shifts as shown in the following examples:

(40)   Dutch

      a. De   tennisbal   heeft   over   de   baan   gerold

         the tennis-ball   has   over   the   court   rolled

         'The tennis ball rolled over the court'

      b. De   tennisbal   is   de   baan   op   gerold

         the   tennis-ball   is   the   court   onto   rolled

         'The tennis ball rolled onto the court.'

                                   (van Hout 1996: 63)

(41)   Italian

      a. La   palla   ha   rotolato   velocemente

         The   ball   has   rolled   quickly

         'The ball rolled quickly'

      b. La   palla   è   rotolata   nel   fossato

         The   ball   is   rolled   in—the   ditch

         'The ball rolled into the ditch'

                                   (Sorace 1998: 10)

Thus, Sorace introduces a new concept, which she calls "gradient effects" on the syntax of unaccusativity/unergativity, which can explain why some variance in the syntactic status of a verb as unaccusative or unergative may occur across languages. The crucial

idea in her theory is that the unaccusative/unergative distinction is characterized by gradience which defines a hierarchy: the Split Intransitivity Hierarchy. The verbs placed higher in the hierarchy show the strongest association with the syntax of unaccusatives or unergatives. The closer we get to the periphery, the weaker the association becomes. The components of meaning which make up the hierarchies are identified not only with lexical-semantic properties of verbs but also with aspectual properties of verbs. The labels for the aspectual classes differ among linguists (ex. Pustejovsky 1988; Grimshaw 1990), but Sorace specifies several lexical-semantic components which can also be compatible with the event structures conceptualised as two definite aspectual sub-events: activity and transition/state. Those verbs with "activity" aspectual properties are generally characterised as unergative, while the verbs with "transition/ state" aspectual properties are identified as unaccusative. Each of the hierarchies is elaborated as follows:

Table 2 : The Split Intransitivity Hierarchy: unaccusatives

CHANGE OF LOCATION	CORE
CHANGE OF CONDITION	
DIRECTED MOTION	
CHANGE OF STATE	
APPEARANCE	
CONTINUATION OF A PRE-EXISTING CONDITION	
EXISTENCE OF A CONDITION	
CONCRETE STATES	
SIMPLE POSITION	
ABSTRACT/PSYCHOLOGICAL STATES	▼

Table 3 : The Split Intransitivity Hierarchy: unergatives

CONTROLLED PROCESS	CORE
NON-MOTIONAL	
MOTIONAL	
UNCONTROLLED PROCESS	
BODILY FUNCTION	
INVOLUNTARY REACTION	
EMISSION	▼

These systematised hierarchies are striking in many respects, three of which will be examined here. Firstly, these hierarchies are based on data from five Western European languages: Dutch, English, French, German, and Italian, and were explicitly developed with a view to application to other languages as well. This is a new step in the sense that, previously, up till now there had been no classification of verb types appropriate for cross-linguistic application.

Secondly, these hierarchies can be used to explain why "unaccusative mismatches" phenomena occur within and across languages. This approach provides us with a different point of view from existing ones. As an explanation for variation in unaccusativity within languages, Sorace points out that it is a wrong presumption which led to the concept of "unaccusative mismatches"— unaccusatives and unergatives belong to distinct homogeneous semantic classes. Her claim is that a weighted system of semantic classification is more appropriate to explain the variation in the domain of unaccusativity, as mentioned before.

Regarding unaccusative mismatches across languages, she explains that the variance of mapping across languages stems from the fact that "different languages may have different cut-off points along the hierarchy" (Sorace 2000: 861), which is supported by the examples from several different languages.

(42) a. La   guerra   è / ?ha   durato   a   lungo
          the   war   is / has   lasted   for long
          "The war lasted a long time"   (Italian)

      b. Mes parents *sont survécus/ont survécu au tremblement de terre
          my parents are survived/have survived to the earthquake
          "My parents survived the earthquake."   (French)

      c. Die Äpfel haben / *?sind den ganzen Winter gehalten
          the apples have   the   whole   winter lasted
          "The apples lasted the whole winter"   (German)

      d. Het concert heft / ?? is een hele tijd geduurd
          the concert has   a   whole time lasted
          "The concert lasted a long time."   (Dutch)

                                                      (Sorace 2000: 868)

As the examples show, auxiliary selection with continuation of condition show variation among these languages, which stems from the fact this class of verbs is positioned in peripheral on the hierarchy.

3. The predicate-based approaches

McClure (1995), Borer (1994), and van Hout (1994, 1996) propose similar hypotheses on mapping. Their ideas are parallel in several points: they assume a direct projection from aspectual/event structure properties onto syntactic argument positions, and define mapping as movement from the inside of VP to some specifier position. All of them posit two distinct specifier positions of functional projections, though the labels which they use are different. We shall start with a review of McClure (1993, 1995).

3.1 McClure (1993, 1995)

McClure (1993, 1995) assumes a mapping from inherent aspectual

structure directly into a particular syntactic structure, which means different aspectual types are projected into syntax in different ways. McClure proposes a semantic representation for each class incorporating Dowty's aspectual calculus, which includes the BECOME, CAUSE, and DO operators, which is summarized by McClure as follows:

(43) BECOME (α) = 1 iff $\neg \alpha$ then α

 CAUSE (α, β) = 1 iff $\neg \alpha \rightarrow \Box \beta$ (modal conditional)

 DO (x, α (x)) $\rightarrow$ volitional(x) (material conditional)

(McClure 1995: 81)

McClure (1995: 81) disagrees with Dowty's definition of BECOME, and defines BECOME as a pair of states, the state before and the satet after a point of change. Dowty's definition of CAUSE is more abstract, but McClure defines it as a connective between the activity and the outcome.

Finally, McClure points out that the DO operator conceived by Dowty mainly represents the volitionality of the subject, which makes it uncertain whether DO represents a situation or set of situations. According to Dowty's aspectual calculus, each verb can be represented by a state and the aspectual operators, in the same way as Vendler's (1967) four aspectual verb classes can be described with them, as seen in section 2.2.2.2.

Table 4 : Logical Structures of Vendler's Verb Class
(Van Valin 1990: 224)

VERB CLASS	LOGICAL STRUCTURE
STATE	**predicate'**(x) or (x, y)
ACHIEVEMENT	BECOME **predicate'**(x) or (x, y)
ACTIVITY (=Agentive)	(DO(x))) [**predicate'**(x) or (x, y)])
ACCOMPLISHMENT	ΦCAUSEΨ, where Φ is normally an activity predicate and Ψ an achievement predicate.

However, McClure emphasises the difference between his semantic definitions for the operators and Dowty's, in the sense that McClure gives the definitions according to a situation-based semantics, while Dowty gives the definitions based on interval semantics. Furthermore, Dowty does not give even an interval semantic definition for the DO operator, while McClure gives a situation-based definition. Here, let us look at McClure's definitions briefly.

McClure represents the single state as "s", regarding it as a basic aspectual component. States are defined as homogeneous processes without clear boundaries", which consists of the very large set of all states. Achievements; or BECOME, consist of the two states which come before and after a point of change, represented by $C = \langle ss' \rangle$. Activities are composed of a set of achievements like $P = \{\langle ss' \rangle \langle s's'' \rangle ... \langle s_n \ s_{n+1} \rangle ...\}$. Thus Activities are characterised as open-ended chains of achievements without clear boundaries. These aspectual structures and their logical types are summarised as follows:

(44) **Aspectual structures**

states = s, a situation

achievements = $\langle ss' \rangle$

activities = $\{\langle ss' \rangle \langle s's'' \rangle \langle s''s''' \rangle \langle s'''... \rangle\}$

(45) **Aspectual types**

BECOME: sets of states → sets of pairs of states

DO: sets of becomings → sets of sets of becoming having the same protagonist

(McClure 1993: 316)

In his mapping theory, these operators are projected into two syntactic aspectual functional heads labelled AP_{outer} and AP_{inner}, which come between IP and VP. DO and CAUSE operators are mapped into the head of the outer projection, while BECOME is mapped into the head of the inner projection. The general model of aspectual projection is illustrated as follows:

(46)

AP_{outer}
/\
--- A_{outer}
/\
A_{outer} AP_{inner}
/ /\
DO --- A_{inner}
/\
A_{inner} VP
/ /\
BECOME --- V
/\
Verb ---
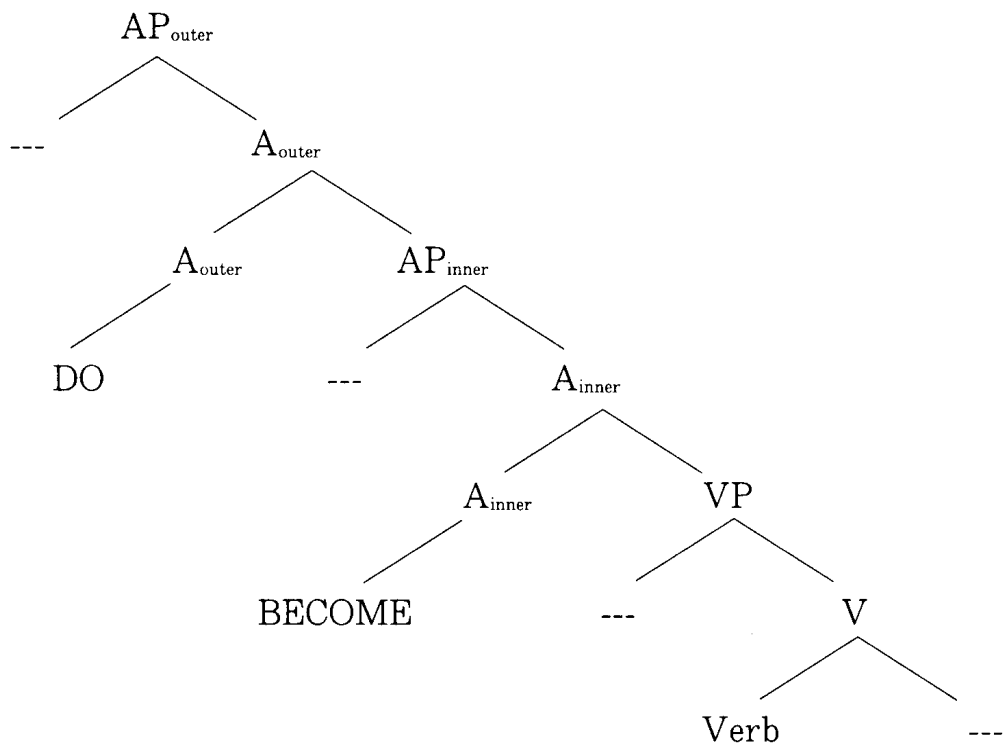
(McClure 1995: 222)

Among these operators, there are certain restrictions, which have been discussed widely in proceeding studies by Dowty (1979) et al. These restrictions are, for example, that there are cases where DO or CAUSE operate on BECOME, while there are no cases where BECOME operates on DO or CAUSE, or where DO or CAUSE operate on each other. McClure argues that his mapping theory illustrated

in (46), can reduce these restrictions on the structure of aspect to general restrictions on co-occurrence in X-bar theory. That is, the standard accounts explain aspectual structure. Therefore it is not necessary to posit separate restrictions for the structure of aspect.

McClure makes some important assumptions in his mapping theory, which can be summarised in the following three points. The first assumption is that "all arguments of the verb are located within VP" (McClure, 1995: 219) at D-structure, which is based on the VP-shell Hypothesis of Larson (1988). McClure gives a VP-shell structure for ditransitive verbs as an example.

(47)

VP$_1$
  subject   V$_1$'
            V$_1$ VP$_2$
                    object   V$_2$'
                            V$_2$ indirect object
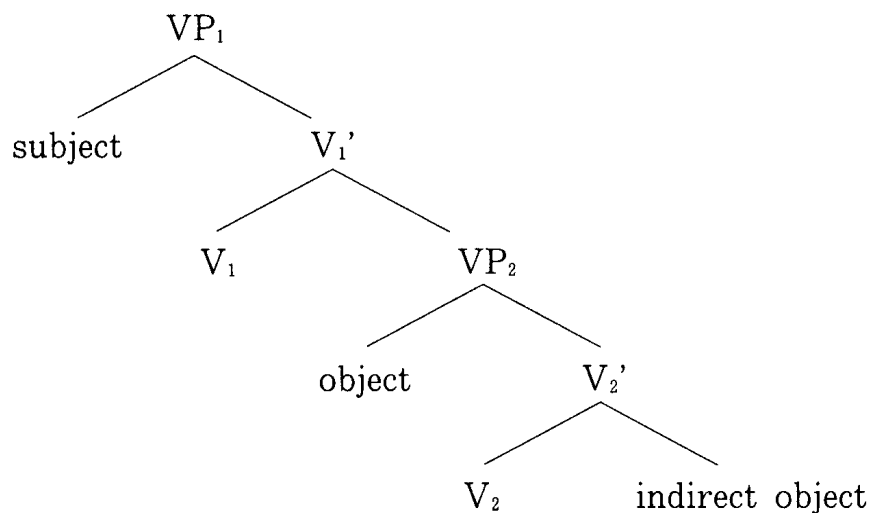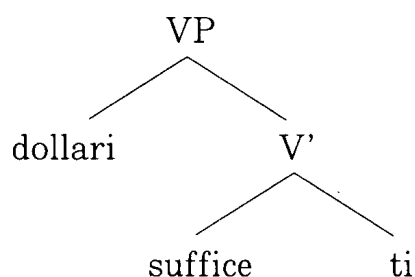
(McClure 1995: 220)

His second assumption takes up an idea from the treatment of negation in Pollock (1989) — the relevant aspectual operator is obligatory for the aspectual projections to be licensed. Thus the verbal head is regarded as an unaccomplished form of the verb before incorporating the aspectual operators via movement.

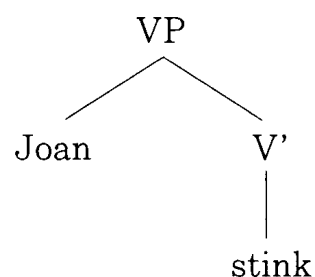Finally, the third assumption is that θ-roles are assigned to the

head's complement or specifier only. Therefore, McClure argues that every argument must be realised as low in the structure as possible, for example, subjects originate in specifier of VP for states and achievements, while subjects are realised in specifier of AP_{outer} for activities. Objects always originate in the complement position of verbs.

McClure illustrates aspectual projections for each aspectual type; Stative, Achievement, and Activity. Let us look at each aspectual type briefly.

(48) a. Stative unaccusative   b. Stative unergative
         "A dollar suffices"   "Joan stinks"

```
              VP                                          VP
             /  \                                        /  \
        dollari   V'                                 Joan    V'
                 /  \                                         |
            suffice   ti                                    stink
```
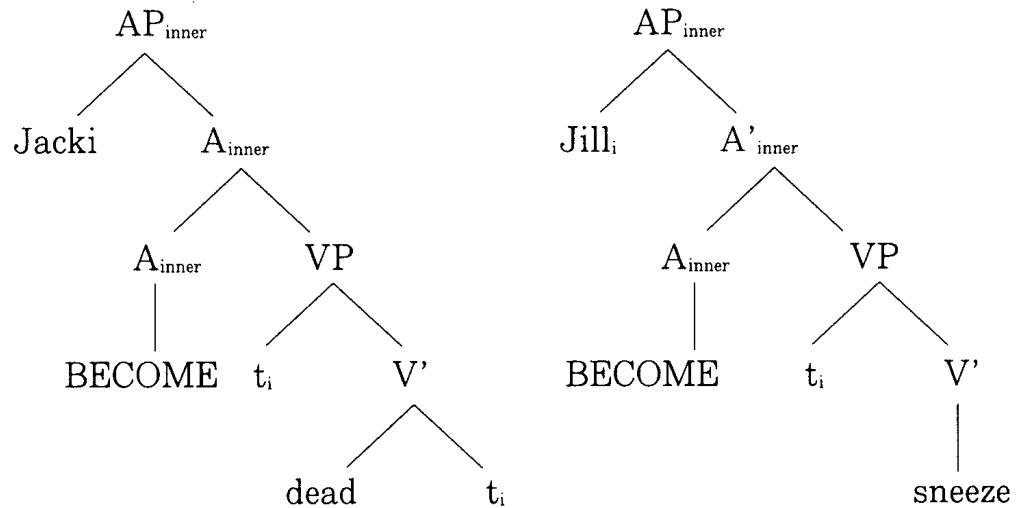
(McClure 1993: 321)

Aspectually, Statives have a simple structure, which does not need any aspectual operator to cope with. Here, McClure's view is no different from the traditional one. If the single argument originates in subject position, the structure will be unergative, while if the single argument is realised in object position, the structure will be unaccusative.

(49)   a. Achievement unaccusative   b. Achievement unergative
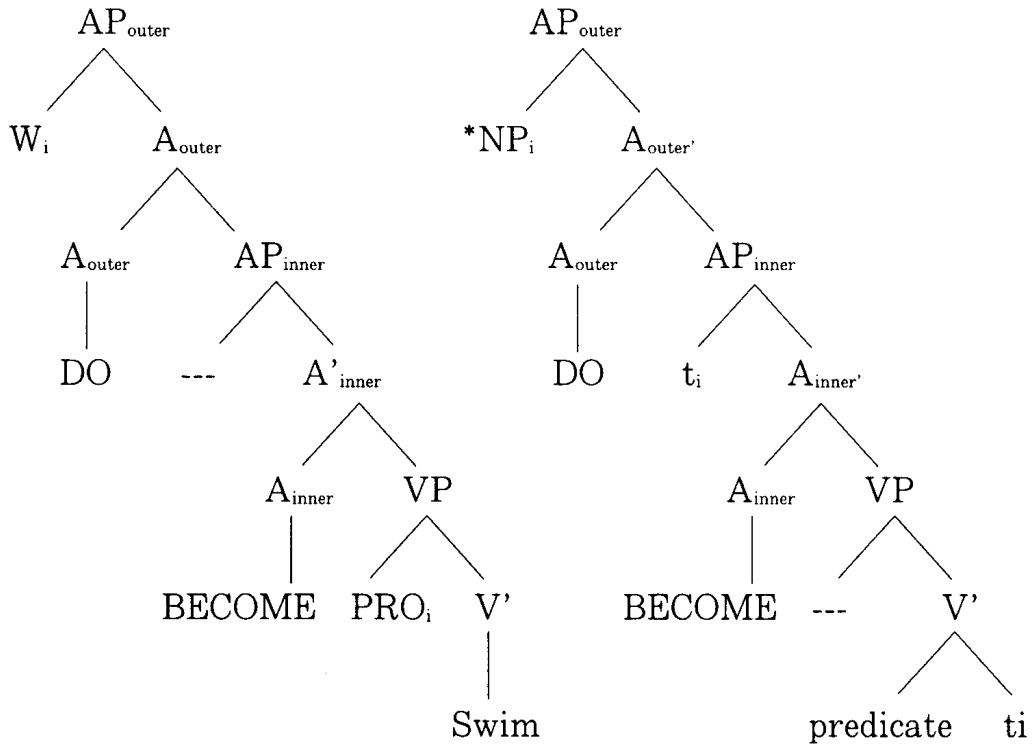   "Jack died"   "Jill sneezed"

(McClure 1993: 322)

In (49a) and (49b), we see McClure's analysis of the D-structure for achievement unaccusative and achievement unergative. Both structures involve an aspectual head, which dominates the aspectual operator BECOME. In both cases, the subject must move out of VP to the non-thematically marked specifier of AP_{inner}. McClure assumes that this movement is caused by the need to get case outside VP. This is compatible with Burzio's generalisation and other related principles.

In (50a) and (50b), the single argument is raised into the specifier of AP by the BECOME operator, but the single argument in (50b) moves from the object position, which makes the sentence (50b) unaccusative, while the single argument in (50a) moves from the subject position, which makes the sentence (50a) unergative.

(50) a. unergative Activity   *b. unaccusative Activity
      "W swim [s]"   (not possible)

```
           AP_outer                          AP_outer
          /      \                          /      \
        W_i     A_outer                   *NP_i    A_outer'
               /     \                            /      \
           A_outer   AP_inner                 A_outer    AP_inner
              |       /   \                      |        /    \
             DO --- A'_inner                    DO   t_i   A_inner'
                    /     \                            /       \
                A_inner    VP                      A_inner     VP
                   |      /  \                         |      /   \
               BECOME  PRO_i  V'                    BECOME ---    V'
                              |                                  /  \
                            Swim                           predicate  ti
```

(McClure 1995: 224)   (McClure 1995: 237)

DO is defined as a control predicate which subcategorises between an individual who is the "Locus of Change" (i.e. the Agent) and an embedded achievement. Since it is not the verb but the DO operator which discharges a θ-role as the Locus of Change to the NP locally, this should be mapped onto the specifier position nearest to the DO operator (i.e. the specifier of AP_outer) at D-structure.

The reason why the structure in (50b) is not allowed can be explained by the θ-Criterion. If the Locus of Change is realised in the complement of VP, it receives a θ-role there, and it can move up to the specifier of AP_inner, which is not thematically marked. However, it cannnot move further into the specifier of AP_outer, because there it would be assigned a second θ-role from the DO operator, which

would violate the θ-Criterion. Discussing the projection of all aspectual types into syntactic configurations, McClure makes two crucial predictions.

(51) 1. All intransitive activities will be unergative.

      2. Only states and achievements can be unaccusative.

<div align="right">(McClure 1993: 320-321)</div>

However, not all states and achievements are unaccusative. As we have already suggested above, there also exist states and achievements which are unergative. McClure suggests that these predictions have cross-linguistic validity, as witnessed by data presented from Italian, Dutch, and Japanese.

To recapitulate, McClure's model is different from other approaches which have been discussed in assuming that the interpretations of each argument are licensed by the syntactic position where it is generated. In other words, what is associated with the interpretation of argument is the syntax of the whole predicate. McClure's idea contradicts to the lexical entry driven approach which places the burden exclusively for the lexical entries.
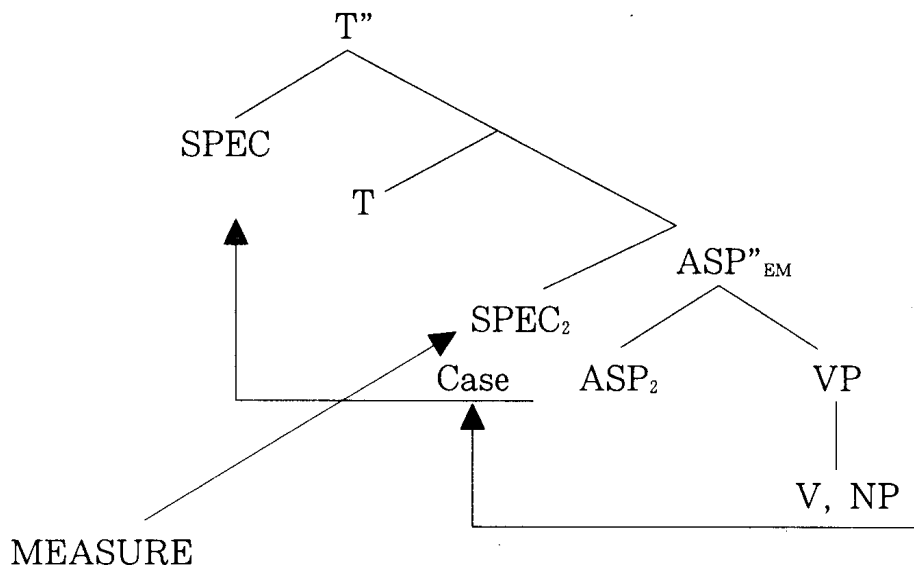

3.2 Borer (1994)

Borer (1994) assumes that the movement of an NP to some specifier of a functional projection results in an aspectual interpretation, which means that different aspectual interpretations are achieved through movement to the specifier position of different aspectual projections. Borer posits two distinct aspectual heads, which are AspEM and AspOR. The former stands for "aspectual event measure", which is an aspectual head dedicated to event measurement. Following Tenny (1992), Borer assumes that telic/atelic interpretation
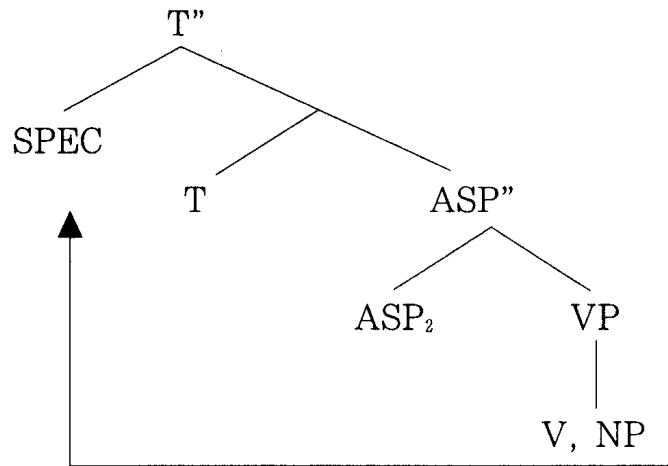
depends on whether the event is measured out or not. When a telic interpretation results, it means that the NP moves into the specifier of AspEM, and incorporates with the node MEASURE, specified as [+EM]. The latter, AspOR, stands for "aspectual originator", which is a higher aspectual head than AspEM. This aspectual head is associated with the interpretation of the argument as an "agent" or "originator of an event". Borer refers to ACTOR from Van Valin (1990) and PROTO-AGENT from Dowty (1991) as similar concepts.

Postulating these two aspectual nodes, Borer illustrates some derivations to show how the movement to the specifier positions of different aspectual projections result in different aspectual interpretations. Among them, we shall look at only two cases, one where the specifier of AspP is projected, and one where the specifier is not projected.

(52)   a. SPEC projected, no Case assigned

b. SPEC not projected (and Case clearly unavailable)

```
              T”
          ／￣￣＼
      SPEC          ＼
        ▲      T        ASP”
        │          ／￣＼
        │       ASP₂      VP
        │                  │
        └──────────── V, NP
```

(Borer 1994: 29)

In (52a), the specifier of AspP is projected, and must be filled. Thus NP moves into the specifier, which is specified as [+EM] entailing a telic interpretation. However, Case is not assigned here, and therefore the NP has to move on further to [SPEC, TP] to receive a nominative Case. That is, this type is identified with unaccusatives, which entail a telic interpretation with nominative Case assigned. In (52b), the specifier of AspP is not projected, hence the NP has to move on directly to [SPEC, TP] to be assigned nominative Case. Therefore, the aspectual properties of AspEM have been deactivated, and never involved with event measurement, which never allows telic interpretation. Hence, this type has an atelic interpretation, and is characterised as unergative.

To summarise, both McClure (1995) and Borer (1994) share the same view that the interpretation of the arguments depends on the syntactic position in the predicate where the argument is generated, and they do not posit any pre-syntactic labelling of arguments, but assume two distinct specifier positions of functional projections: A_{outer} and A_{inner} for McClure (1995), $A_{sp}EM$ and $A_{sp}OR$ for Borer (1994).

Their approach is different from the lexical entry driven approach in which it is suggested that individual argument is interpreted by the syntactic position where it is generated, and do not consider that the interpretations are lexically designated. The main difference between the lexical-entry driven and predicate-based approach can be summarised as follows: the former assigns a crucial role in mapping to the lexicon, while the latter to the syntactic configuration.

3.3 van Hout (1994, 1996)

van Hout (1994, 1996) also assumes that mapping is defined as "feature checking" rather than linking from the verb's lexical arguments onto syntactic argument positions. She employs the idea of "event structure" proposed by Pustejovsky (1988, 1991), and claims that mapping involves checking the event structure of the whole VP predicate and not just that of the lexical verb. Before looking at Van Hout's mapping theory, we shall briefly look at Pustejovsky's theory of event structure.
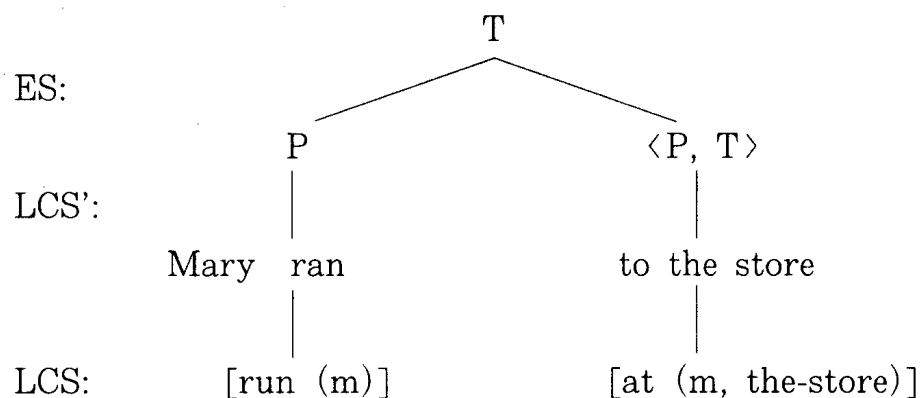
3.3.1 Pustejovsky's Event structure theory

Pustejovsky (1988, 1991) assumes that aspectually different verbs are characterised as having different "event structures", which have different combinations of sub-events. Pustejovsky posits three distinct aspectual primitives: State, Process, and Transition. He defines a *State* (S) as a single event, which is evaluated relative to no other event (ex. *be sick, love, know*); a *Process* (P) as a sequence of events identifying the same semantic expression (ex. *run, push, drag*); a *Transition* (T) as an event identifying a semantic expression, which is evaluated relative to its opposition (ex. *give, open, build, destroy*) (Pustejovsky 1991: 56). These different event types are structurally represented as follows:

(53)   a. State: b. Process: c. Transition:

$$S \qquad\qquad P \qquad\qquad T$$

$$e \qquad\qquad e_1 \ldots e_n \qquad\qquad E_1 \urcorner E_2$$

Pustejovsky defines E as a variable for any event type, which means that Transition is identified as a combination of two sub-events. For example, transitions such as "run to the store" can be decomposed into the two event types: Process and State, as illustrated below:

(54)

```
                              T
        ES:
                     P              ⟨P, T⟩
        LCS':
                     |                |
              Mary  ran          to the store
                     |                |
        LCS:      [run (m)]       [at (m, the-store)]
```

Cause (act (m), become (at (m, the-store)) BY run)

(Pustejovsky 1991: 63)

Pustejovsky explains that the verb *run* basically denotes a *process*, but the presence of a prepositional phrase (PP) brings about an event-type shifting from *process* to *transition*, because the PP *to the store* denotes the *state* of Mary being at the store, and has a function as a "delimiter" of the event. He calls the transformation from *process* to *transition, event composition.*

Pustejovsky (1995a) further extends the idea of event structure, and presents the Generative Lexicon Theory (GL). To put the central

notion briefly, there are four basic levels of linguistic representation.

(55)   1. **ARGUMENT STRUCTURE**: Specification of number and type of logical arguments, and how they are realised syntactically.

      2. **EVENT STRUCTURE**: Definition of the event type of a lexical item and a phrase. Sorts include STATE, PROCESS, and TRANSITION, and events may have subeventual structure.

      3. **QUALIA STRUCTURE**: Modes of explanation, composed of FORMAL, CONSTITUTIVE, TELIC, and AGENTIVE roles.

      4. **LEXICAL INHERITANCE STRUCTURE**: Identification of how a lexical structure is related to other structures in the type lattice, and its contribution to the global organization of a lexicon.

                              (Pustejovsky 1995: 61, My boldtype)

The first and the second levels are the concepts which have often been discussed in the literature (Grimshaw 1990; Williams 1981; Pustejovsky 1991), and is fairly familiar, but the third level "Qualia structure" is a new notion derived from Moravcsik (1975, 1990), whose idea is inspired by Aristotle's modes of explanations (*aitiae*). Pustejovsky gives the following four aspects as the essence of a word's meaning:

(56)   ● **CONSTITUTIVE**: the relation between an object and its constituent parts;

        ● **FORMAL**: that which distinguishes it within a larger domain;

● **TELIC:** its purpose and function;

● **AGENTIVE:** factors involved in its origin or "bringing it about".

(Pustejovsky 1995: 76, my boldtype)

Pustejovsky explains that qualia structure is the central notion for the generative properties of the lexicon, because it allows us to create much more specific concepts with conjunctive properties, which is one of the main goals in GL as well: "Developing a richer, co-compositional semantic representation" (Pustejovsky 1998: 293). Pustejovsky states that there is a set of generative devices operating over the four levels of representation in (56), which provides the compositional interpretation of words in context. The crucial generative operations which he gives are as follows:

(57) ● **TYPE COERCION:** where a lexical item or phrase is co-erced to a semantic interpretation by a governing item in the phrase, without changing of its syntactic type.

● **SELECTIVE BINDING:** where a lexical item or phrase operates specifically on the structure of a phrase, without changing the overall type in the composition.

● **CO-COMPOSITION:** where multiple elements within a phrase behave as functors, generating new non-lexicalised senses for the words in composition. This also includes cases of underspecified semantic forms becoming cotextually enriched, such as *manner co-composition, feature transcription.*

(Pustejovsky 1995: 61, my boldtype)

The third type of semantic transformation is closely related to the

account of the unaccusative/unergative shift. We shall look at it in detail later.

Within the framework of GL, Pustejovsky and Busa (1995) give an account of unaccusative/unergative alternations in a single predicate. Their claim is that the relatedness of the causative/inchoative alternation or the unaccusative/unergative alternation of the same predicate cannot be captured by describing the behaviour of unaccusatives simply in terms of lexically determined verb classes. Their proposal is to regard these alternation as a kind of logical polysemy —"the ability of a lexical item to shift its meaning in context". Based on this idea, two different constructions in causative/inchoative alternation are assumed to be derived from the same lexical representation. More specifically, Pustejovsky (1988) and Chierchia (1989) argue that unaccusatives (inchoatives) are causatives.

The crucial notion in explaining how two distinct surface forms are derived from the same semantic representation is "event headedness". (Pustejovsky 1988, 1995). Pustejovsky defines "head" as "the most prominent subevent in the event structure of a predicate, which contributes to the 'focus' of the interpretations", and also explains that "headedness is a property of all event sorts, but acts to distinguish the set of transitions, specifying what part of the matrix event is being focused by the lexical item selected" (Pustejovsky and Busa 1995: 164).

Pustejovsky assumes that transitions have a binary event structure, and gives four possible patterns of head configuration whose head is marked with an asterisk as follows:

(58)   a. $[_{eT}e_1{}^* < \alpha \quad e_2]$ — *build*

       b. $[_{eT}e_1{}^* < \alpha \quad e_2{}^*]$ — *arrive*

c. $[_{eT}e_1{}^* < \alpha \quad e_2{}^*] —$ *give*

d. $[_{eT}e_1{}^* < \alpha \quad e_2] —$ *break*

(Pustejovsky and Busa 1995: 164)

As shown in (58), the causative/inchoative alternation class of verbs such as *break* are characterised as "headless" — headless is lexically unspecified, which makes available two distinct grammatical constructions. Pustejovsky takes *affondare* (sink) in Italian as an example, whose unheaded event structure is illustrated as follows:

(59)

$$e_{< \alpha}$$

$$e_1 \qquad\qquad e_2$$

[sink_act (x, y)]   [sunk (y)]
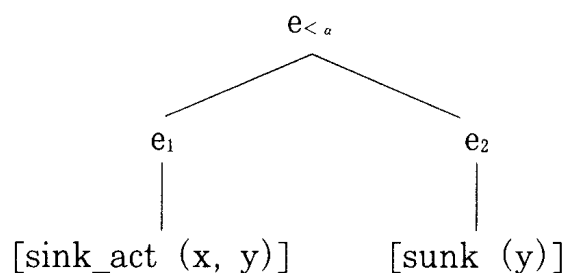
When the result state of the sunk entity is focused on, the predicates are right-headed and realised as unaccusatives, whereas when the agentive cause is foregrounded, the predicates are left-headed and grammaticalised as causatives. However, regarding unaccusative verbs whose headedness is lexically specified, such a shift between left-headed and right-headed is never seen; they are always realised as unaccusative no matter what kind of construction they are embedded in.

3.3.2 van Hout's (1996) CHESS model

The crucial concept behind van Hout's mapping theory is "Event identification", suggested in Grimshaw (1990), and Grimshaw and Vikner (1993), which states that a verb's event structure is

syntactically identified. In other words, the event structure properties in the clause determine its syntactic configuration. The definition of Event identification is given by van Hout (1996: 197) as follows:

(60) **Event identification:**

Mapping requires that a verb's event structure, including every sub-event, be syntactically identified. A phrase in a syntactic argument position identifies (a part of) the event, because it is associated with an event participant.

As mentioned earlier, it should be noted that mapping requires that not the event features of the lexical verb, but those of the whole VP predicate should be identified. This is because the event type of the clause is not necessarily identical to the one that the verb lexically denotes; event type shifts depending on what kind of elements in the VP predicate (ie. prepositions, postpositions, particles, resultative predicates) combine with the verb. To exemplify this, van Hout gives three types of sentences in Dutch with a motion verb, *zwemmen* (swim).

(61) a. Claartje heeft de hele zomer in zee gezwommen.

C. has the whole summer in sea swim

"C. swam in the sea during the whole summer"

b. Claartje is in 2 minuten naar de overkant gezwommen.

C. is in 2 minutes to the across-side swam

"C. swam across in 2 minutes"

c. Claartje heeft haar badpak al in een zomer aan flarden gezwommen.

C. has her swimsuit already within one summer to tatters swam

"C. already swam her swimsuit to tatters within one summer."

Basically, *zwemmen* (swim) lexically denotes the event-type of "process", but these examples show that the event-type shifts depending on the predicate which the verb is embedded in, and the difference in the event type leads to a different mapping onto the syntax.

In (61a), the whole predicate has the event feature "atelic", thus its single participant is mapped onto subject position in an unergative frame. In (61b), the verb combines with a "goal" phrase to yield a telic event, thus its single participant is mapped onto object position in an unaccusative construction. Finally, in (61c), the verb combines with a resultative predicate with a stative PP to denote a telic event, and its single participant is mapped onto subject position in a transitive frame. Generalising these facts, van Hout formulate CHESS[3] model as follows:

(62) **The CHESS mapping conditions: checking event-semantic structure:**

1. Mapping requires that the event structure of a predicate be identified.

2. There are two structural argument positions: the specifier position of Agr,S and Agr,O. An argument in either of these specifier positions identifies in that (sub) event.

3. Telic event type features must be checked in AgrOP

(van Hout 1996: 206)

van Hout postulates two argument positions, which are the specifier positions of AgrS and AgrO. She considers that every verb must project at least AgrSP because the Extended Projection Principle

(Chomsky 1981) requires every sentence to have a subject. Therefore, transitive, unergative, and unaccusative mappings differ in whether AgrOP is projected, or whether the specifier position of AgrOP is filled. Much the same as other scholars (McClure 1995; Borer 1994; Den Dikken 1994), van Hout assumes that AgrOP is the locus of telic feature-checking. Thus, the CHESS model states that, if the predicate denotes a telic event, AgrOP must be projected.

4. Summary and discussion of the interface approach

In this paper, five theories in the interface approach have been examined, which are presented by Levin and Rappaport Hovav (1995), Sorace (2000), MuClure (1995), Borer (1994), and van Hout (1994, 1996). These theories share the assumption that unaccusativity is better explained in the association of both syntactic and semantic factors, because "unaccusativity is syntactically represented but semantically determined" (Levin and Rappaport Hovav 1989: 316). Therefore, this approach does not deny either of the roles of semantic characterization or syntactic configuration in the account of unaccusativity.

Although these studies share a similar view that unaccusativity is associated with the domains of both syntax and semantics, they differ in the view of how the interface works. Thus, they can be classified into two types: the lexical entry driven approach (Levin and Rappaport Hovav 1995; Sorace 2000) and the predicate-based approach (MuClure 1995; Borer1994; van Hout 1994, 1996).

The main difference between these approaches is that the lexical-entry driven approaches assume that the level of lexical representation is the most crucial, because all the necessary information for syntactic projection is included in its lexical entry, and they posit an intermediate level of argument structure between lexical-semantic representation and lexical-syntactic representation. Firstly, the lexical

semantic specifications are mapped onto the position in argument structure such as "agent" or "patient". Then assuming thematic hierarchies or linking rules, the arguments are projected to the syntactic position.

On the other hand, the predicate-based approaches focus on the level of the predicate in which its lexical verb is embedded rather than the lexicon itself, and they posit a direct projection from aspectual/event structure onto syntax without postulating the intermediate level of argument structure.

Levin and Rappaport Hovav (1995) and Sorace (2000) are categorized as the examples of the former: the lexical-entry driven approach. However, in looking at these carefully, Sorace (2000) differs from Levin and Rappaport Hovav (1995) in the view that unaccusativity can be compositional. Sorace's claim is that unaccusativity at its *core* is lexical, which is evidenced by the fact that core unaccusative verbs do not exhibit the syntactic shift between unaccusative/unergative even when they are embedded in an atelic predicate. At this point, it can be said that Sorace shares the similar view with the predicate-based approaches. As we have seen, McClure (1995), Borer (1994), and van Hout (1994, 1996) have in common the basic idea of the Predicate-based approach. The main characteristics of this are the assumption of a direct projection from aspectual/event structure properties onto syntactic argument positions, and also a view of mapping as movement from the inside of VP to either or both of two distinct specifier positions of functional projections. Furthermore, another similarity is that all of them assume an equivalent position as the locus for identifying a telic event (AP_{inner} for McClure 1995; AspEM for Borer 1994; AgrO for van Hout 1994, 1996).

Thus, the ideas behind these three theories are basically the same.

However, they differ slightly in matter of detail. For example, in the aspectual/event theory which they are based on, they show differences. McClure (1995) presents his own aspectual representations, combining Larson's (1990) situation semantics with a modified version of the Vendler/Dowty classification. Van Hout (1994, 1996) employs a mapping theory thoroughly reliant on Pustejovsky's event structure. Borer (1994) does not refer to any specific aspectual theory, but her projection model gets its insights from Tenny's (1994) idea of "delimiter".

Among these theories, Borer (1994) and van Hout (1994, 1996) in particular have much more in common with each other, which is admitted by van Hout herself when she writes that "Borer (1994) arrives at the same conclusion in her approach to mapping, which is in various respects similar to the one advocated here" (van Hout 1996: 207). However, there seem to be two clear differences between them. One is concerned with how to capture the relation between aspectual interpretation and syntactic configuration. Borer claims that movement to the specifier positions of different aspectual positions triggers different aspectual interpretations, which means that aspectual interpretation

Having observed the claim of each approach, it is now time to consider which approach seems to be more plausible. This paper takes the position which the interface approach presents, that is, unaccusativity is better explained in the association of both syntactic and semantic factors. One of the reasons for taking this position is that I support the definition of unaccusativity presented by Levin and Rappaport Hovav (1995) — the distinction between unaccusative and unergative verbs is determined by semantic properties, and represented by syntactic representations. Based on this position, serial experimental studies on L2 acquisition of unaccusativity were conducted,

which will be reviewed in the following issue.

Note

[1] Marantz (1984) further divides *internal arguments* into *direct* and *indirect arguments*. A *direct internal argument* is realised as an argument in direct object position; an indirect internal argument occurs as an argument in oblique position. However, since VP-Internal Subject Hypothesis (Fukui 1986) was presented, the distinction between *external/internal argument* has been in controversy. The definition of *external argument* changes depending on whether this hypothesis is employed.

[2] Anderson (1977: 367) defines *theme* as the entity that is affected by being moved or changed as a result of the action described.

[3] CHESS stands for <u>Ch</u>ecking <u>E</u>vent-<u>S</u>emantic <u>S</u>tructure (see van Hout 1996: 204)

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