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"If arguments receive or check event roles in the syntactic structure, then what makes any given argument an 'agent' (or, perhaps more accurately, an instigator of the action) is the same across verbs. And thus any difference between the agent of 'kissing' and the agent of 'killing' is purely due to the different lexical semantics of the two verbs, and not due to the syntactically-determined instigation."

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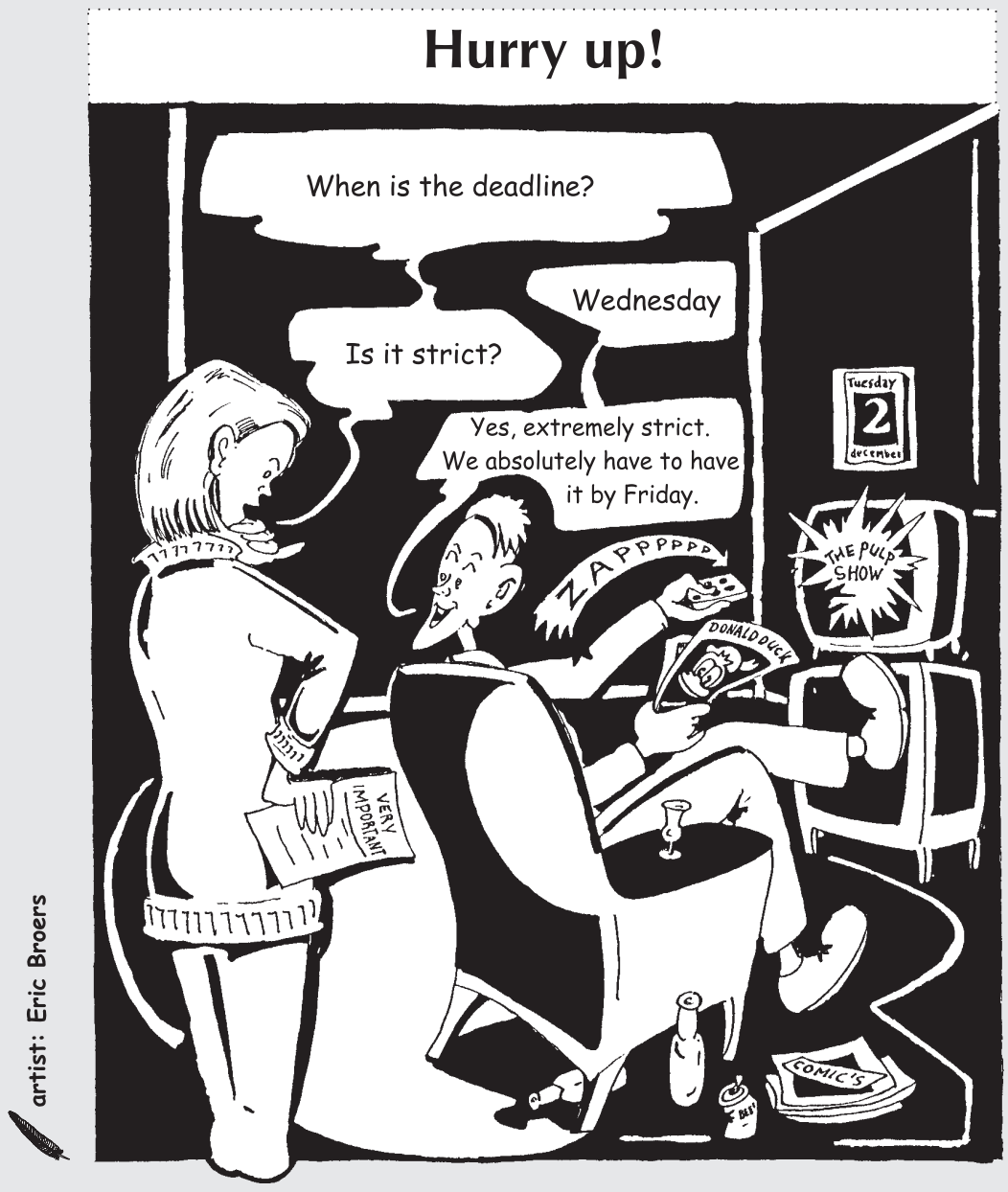

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Dissertations reviewed

Ioana Chitoran, *The phonology and morphology of Romanian glides and diphtongs: a constraint-based approach*. Degree date: August 1997. Cornell University. Supervisor: Abigail C. Cohn. 426 pp. Price: $12. Available from: CLC Publications, Morrill Hall, Cornell University, Ithaca, NY 14853-4701. e-mail: books@plab.dmll.cornell.edu.

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Books reviewed

Chris Collins, *Local economy*. [Linguistic Inquiry Monograph 29.] Cambridge, Mass.: The MIT Press. March 1997. xii + 148pp, with index. 0-262-53144-5. Price: GBP 29.50 (hb), GBP 14.95 (pb).

Next month!

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THE SYNTACTIC REPRESENTATION OF LINGUISTIC EVENTS

Sara Thomas Rosen

Where did you go? Out. What did you do? Nothing.

Robert Paul Smith, Lexikos (1983)

The title of Smith's book grabs the reader because it implicitly makes two false claims: first, it suggests that children's lives are empty, whereas in fact children fill time and space with an unending stream of activities; and second, it suggests that children cannot describe their daily activities, whereas in fact children often fill parents' ears with an unending narration of the happenings in their lives. Events happen, and language quite excellently describes them.

What is an event? We can talk about events in one of two ways — real world events and linguistic events. Real world events are the things that happen. Linguistic events are the linguistic representations of the things that happen. In this paper I will summarize linguistic research about events, focussing on two questions: what about events does language encode; that is, what are the primitive elements of (linguistic) events, and where in the grammar are events represented? This paper reviews the extant semantic and lexical proposals about the representation of events, with the goal of elucidating their implications for how events are represented in the syntax.

Most research on the linguistic representation of events has associated events with either of the two modules that link language to conceptual experience:

I The lexicon. The earliest thinking about events suggested that eventhood had to do with lexical category: insofar as nouns denote things and verbs denote actions (it was thought), verbs should encode events. More currently, argument structure theory assumes that the verb controls the "what's happening" of the sentence, insofar as the theory assumes that the verb determines the participants in the event (i.e. its arguments).

II The semantics. The semantic component of language represents sentence meaning. Sentence meaning is tightly connected to the characteristics of the event; therefore, the event is represented in the semantics.

Work during the last several years has suggested a third possibility for where events are encoded:

III The syntax. Recent work on events demonstrating that syntactic operations are sensitive to eventive properties implies that the event is encoded in the syntax. In particular, event initiation and termination are intimately connected to the purely syntactic functions of Case and agreement, and therefore the event might best be represented in the syntax where Case and agreement are represented.

This paper examines the more significant work done within each of the three main possibilities for event representation — the lexicon, the semantics, and the syntax.

The main body of the paper reviews the various attempts to explain how and where language represents events. Section 2 reviews the semantic approaches to event structure; semantic approaches identify the event as a primitive element in the logical semantics of a sentence. Section 3 reviews lexical approaches to event structure; lexical approaches identify the elements of the event with the particular lexical arguments of the verb. Finally, Section 4 reviews the evidence that the clausal functional projections in the syntax encode specific components of the event; prior semantic and lexical studies of events have provided the crucial insights that led to recent models in which events are encoded in the syntax. The final section of the paper discusses the interactions among the lexical, syntactic, and semantic approaches to event interpretation.

The terms **aspect**, **event**, and **eventuality** have all been used in different ways in the literature, and it is sometimes difficult to sort out exactly what is meant in a given use of each term. The term "aspect" has been used in two distinct ways, and only Smith (1991) has clearly delineated the two uses. In her terminology, **viewpoint aspect** focuses on a temporal perspective of the event, and includes the progressive and (im)perfective. **Situation aspect** refers to the atemporal contours of the event, such as whether the event has a natural terminus; situation aspect is atemporal because the timeframe is irrelevant to the natural unfolding of the event. In order to keep distinct these two notions of viewpoint and situation, I will reserve the term "aspect" for viewpoint aspect and "event structure" for situation aspect. I will have very little to say about viewpoint aspect, except to suggest at the paper's end that (viewpoint) aspect may in fact be related to event structure in ways that research has not yet fully identified.

Within investigations of event structure, the term **event** is usually used to refer to all non-statives, but it may also be used more narrowly to refer to events with a terminus or delimitation (for example Parsons 1990). I will use the term "event" to refer to all non-statives, regardless of termination. Finally, the term **eventuality** is often used in the literature to encompass both events and states (Bach 1986); I will follow this usage when referring to events and states together.

1. Event classification

Before turning to the three main theoretical approaches to the study of events, I will summarize a long and very influential line of research aimed at classifying events. Event classification research has the goal of identifying a small number of event types into which all events can be classified. This research, however, is not explanatory: it does not address how events are represented in the grammar; nor does it try to determine where events are encoded — within the lexicon, the semantics, or the syntax. Explanatory or not, event classification research has pinpointed the basic features of events that need to be represented, and has established a vocabulary for event characteristics that has been used in virtually all investigations into event representation.

Probably the largest portion of the research on events attempts to classify sentences, predicates, or verbs into a small number of event types. The goal of this line of work is to identify a very small number of types of eventualities that encompasses all propositions. Event classification in and of itself does not explain event structure; that is, it does not investigate how language represents events. Event classification has, however, described the basic features of events that need to be explained. In reviewing the extensive classification work, I focus on efforts to identify characteristics of the event that have proven useful in understanding how events are represented.

1.1. Classes as event primitives

Aristotle (1984) proposed the first event-based classification of verbs. His main insight was the distinction between states and events, and between events that have a terminal (or culminating) point and those that are ongoing with no definite terminus. Aristotle proposed three event types: An **actuality** expressed "the existence of the thing". I take an actuality to be a state. A **movement** was an incomplete process, an event lacking an inherent terminus, and an **action** was a process with an inherent end. Critical for current research, Aristotle distinguished between states on the one hand and events on the other, and regarding events, he distinguished between those that have an inherent end and those that do not (movements).

The more recent philosophers Ryle (1949) and Kenny (1963) adopted Aristotle's description of the range of events that language can denote, and then examined events in more detail. Kenny in particular elaborated the Aristotelian three-way classification by listing verbs belonging to each of the three classes, and developing diagnostics for membership within each. Kenny adopted the same three classes as Aristotle, but used his own class labels: **states**, **activities** (actions with no terminus), and **performances** (actions with terminal state). Kenny's main diagnostics are based upon semantic entailments about whether the event can be construed as having taken place when it is still in progress. For example, at any point during the unfolding of an activity, the event described by that activity has taken place, but the same is not true of a performance. The examples in (1) illustrate the distinction between an activity and a performance.

(1)

a. ACTIVITY
Terry is running.
=>entails that Terry has run

b. PERFORMANCE
Terry is building a house.
=>does not entail that Terry has built a house

A crucial difference between activities and performances turns out to be one of **delimitation**. A delimited event is one that has an inherent or natural end. Delimitation is the characteristic of performances that Kenny's test is sensitive to.

Perhaps the most influential work on event classification is that of Vendler (1967). Vendler proposed a four-way classification, which, together with Dowty's (1979) set of diagnostics, makes up the most widely-cited classification system. Vendler proposed that all verbs can be classified as denoting **states**, **activities**, **achievements**, or **accomplishments**. Each is defined in (2) below and exemplified in (3) through (6):

(2)

a. **activities**: events that go on for a time, but do not necessarily terminate at any given point.
b. **accomplishments**: events that proceed toward a logically necessary terminus.
c. **achievements**: events that occur at a single moment, and therefore lack continuous tenses (e.g. the progressive).
d. **states**: non-actions that hold for some period of time but lack continuous tenses.

(3)

ACTIVITIES

a. Terry walked for an hour.
b. Terry is driving the car.

(4)

ACCOMPLISHMENTS

a. Terry built five houses in two months.
b. The child is drawing a circle.

(5)

ACHIEVEMENTS

a. Terry reached the summit in 15 minutes.
b. The vase broke.

(6)

STATES

a. Terry knows the answer.
b. Terry resembles his brother.

Smith (1991) proposed the same four verb classes and added a fifth class called **semelfactives** (instantaneous events), as exemplified by the sentences in (7). Smith defined achievements as instantaneous culminating events, and semelfactives as instantaneous non-culminating events. The addition of semelfactives effectively divides achievements into two classes: events having no duration (such an event's beginning is the same as its end) but which do culminate, and events having no duration and no culmination. Unlike

achievements (see (5) above), semelfactives (such as those in (7)) result in no change of state.

(7)
SEMELFACTIVES
a. Terry knocked at the door.
b. The child coughed.

1.2. Extra-verbal factors in event classification

In their early work on event classification, Aristotle, Ryle, and Vendler all assumed that the object of classification is the verb: because the verb determines the class membership of a predicate, it is the verb that must be classified. Classification of verbs is also found in the works of Bach (1986) and Piñón (1995). However, it has been noted again and again that characteristics of the object, adjuncts, and other materials in the clause contribute to the event type of the entire clause. Thus, Verkuyl (1972), Dowty (1979; 1991), Tenny (1987; 1994), and Ritter & Rosen (1996) all argued that classification must be compositional, not exclusively verb-based. In Rosen (1996), I pointed out various problems with attempts to classify verbs into lexical semantic groups; much of the criticism there is relevant to event classification efforts as well. My most telling criticism consisted of verbs that seemed to belong to one semantic class as used in one sentence, but to a different semantic class as used in another. The same problem afflicts event classification efforts: many verbs cannot be assigned rigidly to one and only one event class, as their behavior is variable and context dependent.

Substantial evidence indicates that sentence material other than the verb can change the overall event type. The direct object affects the event type in at least four different ways. First, the examples in (8) through (11) taken from Ritter and Rosen (to appear), show that the addition of an object can affect the event type.

(8)
ADDITION OF DIRECT OBJECT
a. Bill ran for 5 minutes/*in 5 minutes. activity
b. Bill ran the mile *for 5 minutes/in 5 minutes. accomplishment

(9)
COGNATE OBJECT
a. Terry sang for an hour/*in an hour. activity
b. Terry sang the ballad ?for an hour/in an hour. accomplishment

(10)
X'S WAY CONSTRUCTION
a. Terry sang for an hour/*in an hour. activity
b. Terry sang her way to the Met in 10 years/*for 10 years. accomplishment

(11)
FAKE REFLEXIVE
a. Terry sang for an hour/*in an hour. activity
b. Terry sang herself to sleep in an hour/*for an hour. accomplishment

Second, the examples in (12) through (14) illustrate that event class varies on the basis of the internal characteristics of the direct object.

(12)
SPECIFICITY OF OBJECT
a. Bill wrote letters for an hour/*in an hour. activity
b. Bill wrote the letter *for an hour/in an hour. accomplishment

(13)
COUNT/MASS OBJECT
a. Bill drank coffee for an hour/*in an hour. activity
b. Bill drank a cup of coffee *for an hour/in an hour. accomplishment

Moreover, object Cases can lead to different event interpretations of the predicate. Finnish, as illustrated in (14), marks a morphological distinction between accusative and partitive Case objects. If the object is marked accusative, then the predicate receives an accomplishment reading, as in (14a); but if it is marked partitive, then the predicate is an activity, as in (14b) (Kiparsky 1998, 2-3, 5).

(14)
OBJECT CASE
a. Hän kirjoitt-i kirjee-t accomplishment
he/she write-PST.M.3SG letter-PL.*ACC*
'He/she wrote the letters (...and left).'

b. Hän kirjoitt-i kirje-i-tä activity
he/she write-PST.M.3SG letter-PL.*PART*
'He/she wrote (some) letters (...and left).'
'He/she was writing letters (...when I came).'
'He/she was writing the letters (...when I came).'

Third, verb particles and resultative predicates can change the event character of the predicate, as the examples in (15) and (16) show, taken from Ritter & Rosen (to appear).

(15)
VERB PARTICLE
a. Terry thought for an hour/*in an hour. activity
b. Terry thought up an answer in an hour/*for an hour. accomplishment

(16)
RESULTATIVE
a. Terry ran for an hour/*in an hour. activity
b. Terry ran us ragged in an hour/*for an hour. accomplishment

Finally, the conative alternation and the antipassive alternation can also change the event classification of a verb. Both alternations demote the direct object to an oblique object; eliminating the direct object simultaneously eliminates the delimitation. Examples appear in (17) and (18). Example (18b) has an imperfective or atelic reading.

(17)
CONATIVE
a. Terry ate the apple ??for 10 minutes/in 10 minutes. accomplishment
b. Terry ate at the apple for 10 minutes/*in 10 minutes. activity

(18)
ANTIPASSIVE (Inuit, Bittner & Hale 1996, 36)
a. Juuna-p Anna kunip-p-a-a. accomplishment
Juuna-ERG$_i$ Anna-ABS$_j$ kiss-IND-(+TR)-3SG$_i$/3SG$_j$
'Juuna kissed Anna.'

b. Juuna (Anna-mik)... kunis-si-vu-q. activity
Juuna-ABS$_i$ (Anna-INSTR) kiss-*APASS*-IND-(–TR)-3SGA$_i$
'Juuna kisses/is kissing Anna.'

The various examples of the compositionality of event type necessitate two conclusions: (a) not only the verb determines event type, and (b) systematic relations link sentence structure and event type. It is not yet entirely clear how the syntax relates to event type, but the direct object is involved (Tenny 1994, for example, pioneered work on the relation between event type and direct object). One solution to the problem of how event type is compositional is to classify the predicate or even the whole clause, thereby finessing the issue of how event type is determined. This is essentially Dowty's (1979) tack. Although classifying the entire predicate or clause instead of the verb alone may solve many of the descriptive problems with event classification, classification still suffers from a much more serious shortcoming: even if the resultant classes accurately describe the eventualities that language encodes, the classification approach is inherently non-explanatory, and the classes themselves are not necessarily the primitive elements involved. Thus, however useful classification schemes are in describing clause types, they are not aimed at explicating the basic elements of events at the disposal of natural language, and they do not bring us closer to understanding how and where in the grammar events are encoded. We should not and need not be satisfied with description alone.

1.3. Parameters underlying event classes

A large body of work examines the specific characteristics of predicates that place them in one event class or another. The main goal of this endeavor is to show that the classification of a verb or clause into an event type is attributable to a more basic set of underlying features: each particular classification is dependent on more basic primitive characteristics of the event. Explanations of the parameters underlying classifications go beyond pure description by digging beneath the surface of the event classes. Investigations of parameters have thus identified a set of characteristics of events that any theory of event structure must capture. We will see that the lexical and syntactic theories of events largely try to explain the characteristics identified by this research. Individual attempts at defining the underlying characteristics of the event focus on different characteristics, but all search for the set of parameters that make up the Vendlerian classification. I will call efforts to derive the parameters underlying classification the neo-Vendlerian approach. I will briefly run through a few neo-Vendlerian proposals for the purpose of highlighting the main characteristics of these works; we will see in later sections that the event characteristics identified by the neo-Vendlerians have influenced what it is that event theorists try to explain.

Verkuyl (1993), in reviewing Vendler's classification system, argued that event classes themselves are not primitive. Instead, classification is based on deeper characteristics of the event. He identified many shortcomings in Vendler's classification diagnostics (for example, whether the diagnostics test for continuousness, an event characteristic, or for agentivity, a semantic characteristic), the variation in event type found across the different uses of many verbs (as the examples in (8) through (18) illustrated), and the non-structural, lexical nature of the punctuality of achievements. Verkuyl concluded that classification itself is not as useful as is understanding the parameters that make up the classes. He suggested that combinations of two binary features generate the four Vendler classes: **continuousness**, or whether the event has duration, and **boundedness**, or whether the event has a (natural) terminal endpoint. Activities and accomplishments take place over a period of time, states and achievements do not. Accomplishments and achievements have a terminal bound, states and activities do not. The four classes and their relations are described in (19).

(19)
VERKUYL'S (1993) PARAMETERS OF EVENT CLASSES
a. **state**: –bounded, –continuous
b. **activity**: –bounded, +continuous
c. **achievement**: +bounded, –continuous
d. **accomplishment**: +bounded, +continuous

Carlson (1981) took much the same approach of analyzing the Vendlerian system as binary features of predicates. She argued that three parameters define the event properties of adverbials, verbal aspect, tenses, and quantified objects, all of which are elements that affect event structures. Her three parameters were **point**, **extended**, and **continuous**. In fact, her parameters "point" and "extended" seem to be simply opposing values of a single feature: point refers to momentaneous events, and extended refers to events with duration. Her continuous parameter refers to whether culmination is inherent in the event. Carlson's "continuous" is parallel to Verkuyl's "bounded" and Carlson's "point" and "extended" are parallel to Verkuyl's "continuous".

(20)
CARLSON'S (1981) PARAMETERS OF EVENT CLASSES
a. **state**: +continuous, –extended
b. **activity**: +continuous, +extended
c. **achievement**: –continuous, –extended
d. **accomplishment**: –continuous, +extended

Moens (1987) redefined Vendler's classes by adding a class much like Smith's (1991) semelfactives. Moens also considered the underlying features of his various classes. He suggested that, in addition to states, there are four event types based upon two binary features: **±consequence** (termination or culmination) and **extended** versus **atomic** (momentaneous or pointed) events.

(21)
MOENS' (1987) PARAMETERS OF EVENT CLASSES
a. **culmination**: +conseq, atomic (*recognize, win the race*)
b. **culminated process**: +conseq, extended (*build a house*)

c. **point**: –conseq, atomic (*hiccup, tap, wink*)
d. **process**: –conseq, extended (*run, swim, play the piano*)
e. **state** (*understand, love, resemble*)

Moens further proposed that the event classes in (21) are made up of smaller atomic units: a "culminated process" is a process with a consequent state. The insight that events can be decomposed into sub-events becomes important in much of the work on the lexical analysis of events, e.g. in Pustejovsky (1991; 1995). Further, van Voorst (1988), Grimshaw (1990), and Tenny (1994) all claimed that the arguments of the verb are related to the sub-events. I will discuss the lexically based analyses of events in Section 3.

Finally, Hoeksema (1983) and Mourelatos (1978) both introduced the notion of the countability of an event. They likened countability to the mass/count distinction in nouns: terminating events can be counted but non-terminating processes cannot. Hoeksema (1983), following Mourelatos' arguments regarding countability, argued for a redefinition of the four event classes on the basis of the two features **±count** and **±duration**, as summarized in (22). The term **count** refers to whether instances of an event can be counted: achievements and accomplishments have the feature +count, states and activities do not. The feature of **duration** refers to whether the event takes place over time: activities and accomplishments have duration, states and achievements do not.

(22)
Hoeksema's (1983) parameters of event classes
a. **state**: –count, –duration
b. **activity**: –count, +duration
c. **achievement**: +count, –duration
d. **accomplishment**: +count, +duration

The overall goal of the neo-Vendlerians has been to identify the features that make up the Kenny or Vendler description of event types. The most common features identified are extension over time and having a culmination or terminus:

(23)
Most common parameters of event classes
a. **extended**: states, activities, accomplishments
b. **nonextended** (momentaneous): achievements
c. **bounded** (countable, definite): accomplishments, achievements
d. **unbounded**: activities, states

The work of ter Meulen (1983; 1995) suggested a redefinition of the Vendler classes on very different grounds. She defined the four Vendler classes on the basis of their semantic entailments rather than on whether they have duration or whether they culminate. She defined states as meeting an "upward closure condition", that is, one must look outside the state to see that it is a state. States have no internal structure or change. Events, on the other hand, meet "downward closure conditions" in that they are defined on the basis of their parts. Ter Meulen's event classes are summarized in (24).

(24)
Ter Meulen's (1983) event classes
a. **activity**: homogeneous reference, all parts are equivalent to the whole
b. **accomplishment**: indivisible, the parts are not equivalent to the whole
c. **achievement**: instantaneous and therefore indivisible

Ter Meulen viewed the four Vendler classes as a semantic hierarchy: achievements are a special case of accomplishments, accomplishments are a special case of activities, and activities are a special case of states.

In her later work, ter Meulen (1995) examined the event classes in terms of the dynamic discourse interpretation that each accords. (See also Hinrichs 1985 for a discourse-oriented approach to events.) Ter Meulen defined three characteristics of events, corresponding to the three event classes: **holes** (activities) are homogeneous events, **filters** (accomplishments) are heterogeneous and no part is identical to the entire event, and **plugs** (achievements) have no distinction between the initial and final stage of the event. Her purposes in defining events in this fashion were to illuminate the relation between event type and other events in the discourse, and to understand the temporal relation between each event and the other events described.

There is no doubt that efforts toward event classification have increased our understanding of the event, particularly efforts to identify the features underlying event classes. However, classification has various problems. First, classifying verbs in and of itself does not shed much light on the verbs' semantic or syntactic behavior. As outlined above, the verb alone contributes only part of the information necessary to determine the semantic and syntactic outcomes. For this reason, many researchers have turned to the classification of predicates rather than of verbs. It is possible that classifying predicates rather than verbs could produce a descriptively accurate account of the semantic and syntactic outcomes. However, a descriptively accurate account would be just that — descriptive — and no more. Understanding the linguistic representation of events requires deeper analyses than mere classification schemes. The neo-Vendlerians who have investigated the features underlying event classes have indeed looked deeper than the classes themselves, and the underlying features that they have found appear more enlightening than the original classifications themselves. As we have seen, investigations of underlying features have largely converged on the existence of a terminal endpoint (delimitation) and the existence of duration. The consequent challenge to any theory of event structure is to arrive at a representation of events that can explain the effects that delimitation and duration have on the lexical, semantic and syntactic representation of events.

2. Events in logical semantics: the Davidsonian [e]

2.1. [e] in the logical semantics

Panini (B.C.E.), as cited by Parsons (1990), observed that verbs denote particular actions and nouns denote things that relate to these actions, either by doing the action or by being the object or instrument of the action. Plato (366 B.C.E.) made the same syntactic distinction between actions and non-actions: he observed that a verb denotes an action, whereas a noun denotes the thing that performs an action. Plato further stated that a sentence is constructed of an action (verb) plus a result (presumably the object nominal).

These early works on events claim that language encodes two basic sorts of information — actions and non-actions — and that the distinction between actions and non-actions is encoded in the lexical category of words: nouns represent things and verbs represent actions. Davidson (1967) refined the notion of "action" by proposing that action sentences include an event variable in their logical semantics. His proposal and subsequent work building on his proposal constitute the Davidsonian and neo-Davidsonian approach to the encoding of events in language. The Davidsonian approach looks at the relation between the event denoted by the verb and other constituents in the sentence, such as modifiers. Davidson argued that events logically are like "things" in that they introduce a variable that can be modified and quantified over. He discussed a problem first pointed out by Kenny (1963) with determining the valence of event predicates. Event predicates can include any number of modifiers, including time, place, manner, and instrument. Just as nominal modifiers modify the noun, event modifiers modify the event. However, one would not want to posit that a verb like *butter* in (25) is simultaneously a two, three, four, five, etc., place predicate (the example is from Davidson 1967), which is a possible consequence of the logical semantics of the modification in these sentences. In fact, adjuncts freely modify, and any number of adjuncts can be added to a predicate. A system that treats the verb *butter* differently in each case would not capture the right generalizations about adjunct modification in language.

(25)
a. Jones buttered the toast.
b. Jones buttered the toast slowly.
c. Jones buttered the toast slowly, in the bathroom.
d. Jones buttered the toast slowly, in the bathroom, with a knife.
e. Jones buttered the toast slowly, in the bathroom, with a knife, at midnight.

Davidson represented the logical semantics of action sentences by including an event position, as sketched out in (26). Because the event position is a variable, it can be added to the semantic representation of each modifier, allowing modification to be freely added along with an event variable. The semantic representation then captures the fact that an adjunct modifies the event without changing the valence of the basic predicate.

(26)
a. (∃e) (buttered (Jones, the toast, e))
b. (∃e) (buttered (Jones, the toast, e) & (slowly, e))
c. (∃e) (buttered (Jones, the toast, e) & (slowly, e) & (in the bathroom, e))
d. etc.

An advantage of the so-called Davidsonian [e] is its ability to capture the modification of the event in the logical semantics without positing "variable polyadicity" of a given verb: because the event is represented as a variable, the event variable can be included in the logical semantics of each modifier. Further, the event variable allows us to represent the arguments of the verb separately from the event, allowing for independence of the extension of the arguments and the extension of the event. Davidson (1967, 117-19) illustrates with the example in (27): given the independence between event and argument reference, the statement in (27b) allows substitution of the name of the argument in (27c) with no resulting effect on the event.

(27)
a. (∃e) (Flew (I, my spaceship, e) & To (the Morning Star, e))
b. the Morning Star = the Evening Star
c. (∃e) (Flew (I, my spaceship, e) & To (the Evening Star, e))

Others have pointed out many advantages of the Davidsonian [e] in representing the logical semantics of event-denoting sentences. To begin with, the event variable leads to a natural account of the tense dependency between perception verbs and their infinitival complements (Higginbotham 1983; Vlatch 1983; Parsons 1990). Parsons (1990) argued further that a Davidsonian analysis of events allows an identical analysis for events represented syntactically as nominals and events represented syntactically as verbs — both N and V can denote events. For example, one can refer to the event of the verb *to burn* or the noun *a burn*, as in the examples below: both denote an event. Interestingly, Parsons' comment implicitly refutes Panini's and Plato's claims that verbs and nouns are the syntactic realizations of different semantic types, actions and things respectively. Moreover, Parsons maintained that giving variable reference to events allows explicit quantification over events the same way that quantification applies over things. Parsons (1990, 18-19) exemplified the quantificational property of the Davidsonian [e] with the example in (28).

(28)
a. In every burning, oxygen is consumed.
b. Agatha burned the wood.
c. Oxygen was consumed.

The sentence in (28c) follows from (28a, b) because the quantification over the burning in (28a) is logically related to (28b) and (28c). In the logical semantics of (28c), the consuming of oxygen follows from the quantification in (28a) and the specific event in (28b):

(29)
a. (e) (Burning(e) → (∃e') (Consuming(e') & Obj(e', O_2) & In(e, e')))
b. (∃e)(Burning[e] & Subj(e, Agatha) & Obj(e, wood))
c. (∃e')(Consuming(e') & Obj(e', O_2))

Various uses of the Davidsonian [e] have been made in the literature, and the different treatments can be classified into the Davidsonian and neo-Davidsonian camps. The Davidsonian analysis places an event [e] argument in the main predicate of the clause, and distributes it among each of the modifiers of the clause in the logical representation (Davidson 1967; Bayer 1997, for example). The neo-Davidsonian treatment carries this further to distribute the [e] argument among not only the modifiers, but also among the individual arguments of the predicate: neo-Davidsonians also tend to represent each thematic argument of the predicate along with the event argument (Krifka 1989; 1992; Lasersohn 1995; Parsons 1990, to name a few). Although the various proposals are interesting in their own right, and although they vary substantially, many of them focus on details of the logical semantics of predicates and events and thus are not of particular relevance to the present paper. I will focus on the syntactic representation of events and its effects on interpretation. Therefore, I will give the various Davidsonian and neo-Davidsonian analyses unfair short shrift, in order that I might focus on the relation between events and the syntax.

I would like to highlight one neo-Davidsonian analysis, however, because it combines verb classification and neo-Davidsonian event variable approaches. Parsons (1990) included in his neo-Davidsonian logical representation an extra term corresponding to the event type of the predicate. He distinguished two different types of eventualities: eventualities that culminate, called Cul (achievements and accomplishments) and those that do not, called Hold (states and activities).

(30)
a. Jones buttered the toast.
b. (∃e) (buttering (e) & agent (e, Jones) & theme (e, toast) & (∃t) (t<now & Cul (e, t))

(31)
a. Mary knows Fred.
b. (∃e) (knowing (e) & exper (e, Mary) & theme (e, Fred) & Hold (e,now))

Parsons' (1990, 25) attempt to combine the (neo-)Davidsonian logical argument analysis with event classification was quite interesting. In adding a logical argument that refers to the event type (Cul versus Hold) to the logical semantics of the sentence, Parsons implied that the event type is itself a semantic entity separate from the event and separate from the event's arguments and modifiers. We will see in Sections 3 and 4 that the lexical and syntactic approaches to events have associated the arguments of the verb with the event type, albeit in very different ways; in certain respects the arguments define the event and the event type.

2.2. [e] in the syntax

For the purpose of understanding the relation between the syntax and the semantics of events, the most interesting use of the Davidsonian argument is the proposal that events are represented in the argument structure of the verb. The proposal effectively adds an argument (which must be satisfied) to the syntactic representation. I will discuss two theories, which differ in the details of which verbs have this argument, and how the argument is syntactically satisfied.

Higginbotham (1985) posited that the Davidsonian [e] appears in the argument array of all verbs, including event-denoting verbs and non-event denoting statives. Because [e] is an argument of the verb, in parallel with the verb's thematic arguments, [e], like thematic arguments, must be syntactically satisfied (as a consequence of the Theta Criterion, see Chomsky 1981). Higginbotham suggested that [e] is satisfied through argument binding to I (or T in more current phrase structure). The example in (32) shows Higginbotham's mechanism of argument satisfaction (Higginbotham 1985, 554-556). In (32b), the numbers within the brackets <> refer to the thematic arguments of the verb, presumably annotated with semantic role labels such as experiencer or theme; the *E* refers to the Davidsonian argument in the logical semantics of the sentence.

(32)
a. John saw Mary.
b. *see*, +V, -N, <1,2,*E*>
c. (∃e) see(John, Mary, e)

Because the <E> is an argument of the verb, it must be syntactically satisfied. Higginbotham suggested that the mechanism responsible is *theta binding*: the <E> argument is bound by the inflection node (I), just as the referential argument of a noun is bound by the D node. Binding of the <E> results in existential closure of the event.

Kratzer (1989) also suggested that the Davidsonian [e] is an argument of the verb, in Kratzer's case, syntactically satisfied by Tense. Unlike Higginbotham, however, Kratzer posited that only some verbs have [e] as an argument. She proposed that there is a syntactic distinction between **stage level predicates** (denoting events and temporary states) and **individual level predicates** (denoting relatively permanent properties), a semantic distinction that Carlson (1977) first noticed. Kratzer argued that only stage level predicates have an [e] in their argument structures. She made a strong case for the claim that the subject of stage level predicates, but not the subject of individual level predicates, is projected internal to the VP (cf. Diesing 1988), and that the [e] argument functions as the (implicit) external argument of the verb.

The Higginbotham/Kratzer uses of the Davidsonian [e] made two claims about the representation of events that substantially advanced lexical and syntactic analyses of events. First, Higginbotham and Kratzer provided a syntactic representation for the event. Davidson previously had claimed that events have the representational equivalent of things or entities in the semantics. The Higginbotham/Kratzer representations imply that events also behave like entities in the syntax: a syntactic inflectional node must satisfy the event argument, just as thematic arguments must be satisfied by specific nodes in the syntax. Second, the Higginbotham/Kratzer representations place [e] on a par with thematic arguments: because [e] is an element in the argument structure of the verb, it behaves like an argument, is discharged to a syntactic position like an argument, and, in Kratzer's view, has the status of an external argument with all the privileges of external arguments. The view that the [e] is an argument of the verb differs considerably from neo-Davidsonian analyses, which allow thematic arguments to be arguments of the event. The Higginbotham/Kratzer analyses claim that [e] is a (thematic) argument of the verb: although it has no semantic role label, it is one of the arguments, and it is discharged to a syntactic position.

A number of problems do exist with the Higginbotham/Kratzer syntactic analysis of the (neo-)Davidsonian event variable. First, in general, arguments of the verb have semantic content, but it is not clear whether or in what way [e] has semantic content. Second, arguments of the verb are satisfied by XPs in argument position (subject or object); in contrast, Higginbotham and Kratzer would satisfy the event argument in an inflectional (functional) head (I or T). It is troubling that the syntactic treatment of [e] differs fundamentally from the syntactic treatment of thematic arguments. We will see in Section 4 that it is indeed possible to represent events in the syntax without violating the core assumptions of argument mapping. Third, the monolithic nature of the Davidsonian [e] is at odds with lexical and syntactic evidence regarding the nature of the event. We will also see in Sections 3 and 4 that the event is far too rich in its internal structure and its relation to the syntax is far too complex to permit an analysis that does not allow decomposition of the core event.

3. Events in the lexicon/syntax mapping

Linguistic research has found a tight relation between the lexical entry of a verb and the syntactic structure that it is used in. The omni-presence of the lexicon-syntax relation has prompted the exploration of the limits and constraints on the behavior of lexical items in the syntax, resulting in the development during the last decade and a half of theories of the lexical-syntactic interface. Research looking at the syntactic representation of events developed from two sources: work on argument structure, and work on event classification and the logical semantics of events. Lexical analyses of events and argument mapping analyses generally address the same questions — the relation between verb meaning (qua event interpretation and argument interpretation respectively) and the syntactic realization of arguments.

3.1. What a mapping theory must explain

The tendency for specific semantic (thematic) arguments to have characteristic syntactic positions has led to two major proposals regarding universal mapping relations: Perlmutter & Postal's (1984) Universal Alignment Hypothesis (UAH) and Baker's (1988) Uniformity of Theta Assignment Hypothesis (UTAH). The U(T)AH states that specific semantic arguments belong in specific syntactic positions, and that there is a one-to-one mapping between semantic argument and initial syntactic position. Universal alignment predicts identical mappings of arguments into syntax across verbs and languages.

Any theory of the relation between the lexicon and the syntax must explain many phenomena concerning argument mapping. One phenomenon is the near-universality of certain mappings across languages. The most obvious (indeed, perhaps the only universally agreed-upon) of the various mapping universals is that agents appear in subject position in all languages, at least as far as we know. No other thematic role behaves quite so predictably. Thus, theme can appear in object, subject, or indirect object position, and experiencer can appear in subject or object position. The qualification "near" in the term near-universality suggests two research agendas: (a) we must understand and explain the observed regularities in number and position of arguments across the syntactic structures of all languages, and (b) we must understand and explain why the number and position of arguments is not exactly identical in all syntactic structures across all languages.

A lexicon-to-syntax mapping theory must also explain the existence of argument alternations. Given that a semantic role can appear in different syntactic positions for the same verb, then either mapping is not universal, or accounts of argument mapping based on the lexical semantics of the verb are mistaken in their assumptions about what controls mapping. A common solution to the failure of U(T)AH to explain the evident variability of the syntactic positions of semantic roles is to posit the existence of semantically-defined classes of verbs. By hypothesis, each class of verbs defines a set of mapping relations and a set of argument alternations that derive new lexical items with new mappings (e.g. Levin, 1993; Levin & Rappaport Hovav, 1995; Pinker, 1989). The ultimate goal of semantic classification is to find a set of semantic generalizations that totally account for the number and position of arguments.

A problem with semantic classification is that, in apparent contradiction to its core U(T)AH assumption, no one-to-one correspondence exists between the semantic meaning of a verb and its syntactic behavior. Semantically similar verbs may behave differently across languages (C. Rosen 1984), a given verb within a language may have multiple syntactic realizations (C. Rosen 1984; S.T. Rosen 1996), and semantically similar verbs may allow different mappings (Rosen 1996). Simple description shows that verb behavior is variable and context dependent. This context-based variability directly contradicts hypotheses about semantically-based universal alignment. More critically, a verb classification model would claim that (by

assumption) two verbs are semantically similar only if they are syntactically identical. And so, whenever two verbs behave differently in the syntax, one must posit more and more detailed semantic classes. Should the syntactic data demand it, they could end up with placing every verb in a different class (this sometimes happens – see the semantic classes in Pinker 1989). Because there are no a priori semantic criteria restricting verb classification, theoretical claims based on classification cannot be disproved, because verb classification proponents need only add more and more verb classes as needed to fit the available data.

3.2. Theta roles don't determine the mapping

In recent work, several researchers have suggested that the role an argument plays in the event described by the verb determines how and where the argument is mapped into the syntax (Dowty 1991; Grimshaw 1990; Tenny 1994; Ghomeshi & Massam 1994; Rosen 1996; van Voorst 1988; van Hout 1993, 1996). These researchers have concluded that semantically based verb classes and thematic roles at best partially determine the mapping. Instead, syntactic arguments identify participants in the event, and the work on event mapping has proposed a set of **event roles**, which determine the position of the arguments in syntax. Event role mapping theories postulate that the verb lexically determines a set of event roles, and each event role maps to a particular syntactic position.

Some examples of event roles, taken from Grimshaw (1990), Tenny (1994), and van Voorst (1988), are given in (33). Event roles describe the part of the event that the argument is linguistically involved in. For example, an **originator** (cf. van Voorst) begins, or instigates an event; a **delimiter** (cf. Tenny, van Voorst) determines the extent, or unfolding of the event; a **terminus** (Tenny) determines the endpoint of the event.

(33)

a. Ned$_{\text{<originator>}}$ ate the apple$_{\text{<delimiter>}}$.
b. Fred $_{\text{<originator>}}$ pushed the cart$_{\text{<delimiter>}}$ to the gas station$_{\text{<terminus>}}$.

Crucially, event roles are independent of semantic roles. (This statement isn't quite true for Grimshaw, who argued that an event role hierarchy and a semantic role hierarchy jointly determine argument mapping.) For example, instruments and locatives generally appear in oblique position, but if an instrument is interpreted as an originator, it will map to subject position (*the key opened the door*), and if a locative delimits an event, it will map to direct object position (*The farmer loaded the truck with hay*). Tenny proposed that the mapping of verbal arguments is constrained by the event rather than by thematic roles:

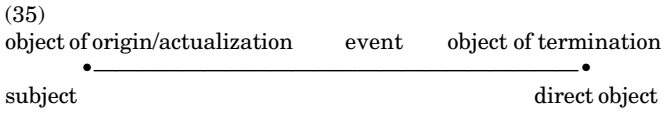
(34)

ASPECTUAL INTERFACE HYPOTHESIS (AIH)
The universal principles of mapping between thematic structure and syntactic argument structure are governed by aspectual properties. Constraints on the aspectual properties associated with direct internal arguments, indirect internal arguments, and external arguments in syntactic structure constrains the kinds of event participants that can occupy these positions. Only the aspectual part of thematic structure is visible to the universal linking principles. (Tenny 1994, 2)

The AIH explicitly denies that semantic or thematic roles play any part in determining the mapping of arguments into the syntax. Tenny proposed a set of lexicon-to-syntax mapping principles that determine the position of internal arguments based primarily on the role that each argument plays in delimiting the event.

Van Voorst (1988) arrived at the same conclusion that the direct object plays a role in delimitation. He also suggested that origination maps to a particular position in the syntax — the subject. Van Voorst represented Event Structure as a line bounded at one end by a point that marks the origination (initiation) of the event and at the other by a point that marks the event's termination. He identified the initiation point with "the object of origin or actualization" (i.e., with the participant responsible for launching or effecting the event), and he identified the end point with "the object of termination" (i.e., the participant that determines when the event is complete). A set of Event Structure Correspondence Rules implied by the diagram in (35) maps the object of origin or actualization to the D-structure subject, and the object of termination to the D-structure object.

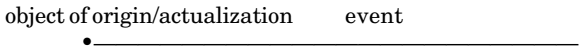
(35)



Van Voorst used event structure to represent the three (non-stative) event types in the Vendler event classification system. (Only non-stative sentences have an event structure.) As shown in (36), activities or processes have no inherent endpoint, so their event structure representation lacks an object of termination. Van Voorst assigned the structure in (36) to achievements as well, because their objects are non-delimiting. Accomplishments, on the other hand, always have an inherent endpoint, though they may or may not have a beginning point. Consequently, their event structure representation contains only an object of termination as in (38), or else contains both an object of termination and an object of origin/actualization as in (37).

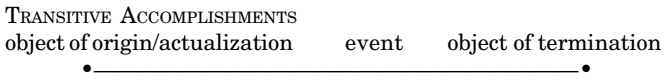
(36)

ACTIVITIES



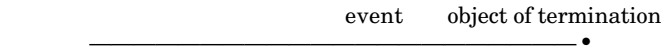
(37)

TRANSITIVE ACCOMPLISHMENTS



(38)

INTRANSITIVE ACCOMPLISHMENTS AND ACHIEVEMENTS



Tenny (1987, 1994) linked the terminal point of a delimited event and the direct object. Van Voorst (1988) made the same point, and both he and Grimshaw (1990) further hypothesized that origination or causation is associated with the subject of the clause. We can thus (informally and non-technically) view events as potentially including two event bounds that are identified with the underlying subject and object.

The event role mapping approach generally assumes that event information appears in the lexical semantics of a verb. The works just discussed imply that the lexical semantics of the verb determines (a) the event roles of its arguments, and therefore also determines (b) the mapping of the event arguments into the syntax. However, these several works are not explicit about the lexical representation of these event roles. In contrast, Pustejovsky (1991; 1995) and Jackendoff (1990) have proposed specific representations for the event in the lexical semantics of the verb.

Pustejovsky (1988; 1991) makes two claims about the structure of events: (a) events have internal structure that can be decomposed into smaller parts, and (b) traditional thematic roles can be redefined in terms of the internal analysis of events. Pustejovsky identifies three temporal subperiods — initial, internal, and final — which identify three underlying properties of event classification. He uses these temporal periods to define three event types — **states**, **processes** and **transitions** (Pustejovsky 1991, 56).

(39)

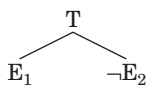
STATE (S): a single event, which is evaluated relative to no other event

(40)

PROCESS (P): a sequence of events identifying the same semantic expression

(41)

TRANSITION (T): an event identifying a semantic expression, which is evaluated relative to its opposition



E in the structure for a transition stands for any event type. Transitions generally decompose into a process (P) with a culminating state (S).

Pustejovsky included in the verb's lexical conceptual structure (LCS) a set of semantic operators that map onto the above-defined event structures. These operators were **ACT**, **CAUSE** and **BECOME**. An LCS with no event operator is a state. An LCS with the BECOME operator maps onto a transition in the event analysis, and one with the ACT operator maps into a process. The CAUSE operator appears to give agentivity; because his event structures lack the notion of origination, the CAUSE operator has no direct event representation. Thus, the two operators ACT and BECOME serve to distinguish the three main event types. In later work, Pustejovsky (1995) suggested that the LCS of a verb includes an event structure representation. The LCS breaks down the sub-event structure of the verb's interpretation, using three event types outlined above. Pustejovsky also included an **extended event structure**, a set of restrictions on the relations between the event and its component parts. These relations included notions such as **overlap**, **partial ordering**, and **inclusion**. So, for example, Pustejovsky (1995, 71) analyzed the event structure of a verb like *build* as in (42). The symbol $<_{\alpha}$ stands for the relation "exhaustive ordered part of". This particular relation indicates that the parts of the event are partially ordered. The sub-events of other verbs may be overlapped, as he argued is the case for the verb *accompany*.

(42)

$$\begin{bmatrix} \textbf{build} \\ \text{EVENTSTR} = \begin{bmatrix} \text{E1} = \text{process} \\ \text{E2} = \text{state} \\ \text{RESTR} = <_{\alpha} \end{bmatrix} \\ \ldots \end{bmatrix}$$

The event denoted by the event structure is then cross-referenced with an [e] argument in the so-called **qualia structure**. The qualia structure contains in essence the word meaning (including the constituent parts of the word), how the item fits into the larger domain, the item's purpose or function, and its origin. The crucial point is that event structure is largely specified in the lexical representation of the verb. Compositionality is represented by combining the lexical representations into larger conceptual structures.

Like Pustejovsky, Jackendoff combined LCS representations into composite conceptual structure (CS) representations. Also like Pustejovsky, Jackendoff placed event information within the LCS of a verb, but Jackendoff did not differentiate event information from the thematic information as clearly as did Pustejovsky. Jackendoff's LCS representations include a code for EVENT versus STATE, but the particular event type is determined by the internal structure of the lexical representation. Jackendoff divided the LCS representation into two components, called tiers. The **Thematic Tier** contains thematic role information. One could view a portion of the thematic tier as being more event-like than thematic in that it includes entities like CAUSE (akin to event instigation), and includes information about goals (which might be event delimiters). The **Action Tier**, contains information concerning agentivity (essentially willful causers) and patientivity (affectedness). Despite the name Action Tier, it is not entirely clear that it does contain event information. Instead, it seems to include semantic information embellishing the event information that exists in the Thematic Tier.

The lexicon-based and argument-oriented approach to event structure espoused by Tenny and van Voorst clarifies a number of syntactic constructions, argument alternations, and their interpretations in a variety of languages. For example, the approach makes sense of the fact

that a semantic theme maps to object position only if it delimits the event and otherwise maps elsewhere. In general, the approach allows thematic roles to appear anywhere in the syntax, but event roles are assigned to particular positions. In addition, event mapping recognizes that the entire predicate determines the event type and not the verb itself. By allowing all constituents of the predicate, including arguments and adjuncts, to play a role in the event and thereby to determine the event type, event mapping goes a long way toward recognizing the syntactic influence on events. However, although the event mapping approach explicitly recognizes the compositionality of events, it has not provided a systematic account of the compositionality. Given that the parameters controlling the event are assumed to be encoded in the lexicon, less compositionality and more lexical control are expected.

Ritter & Rosen (1996) argued that the lexical semantics of the verb has limited influence on the syntactic behavior of the arguments or the semantic interpretation of the clause. Whereas event mapping models claim that verb semantics tightly controls the syntax, we showed that the syntactic position of the arguments and the specific semantics of the arguments themselves plays a large role in verb interpretation: verbs at least in part mean what the syntax allows them to mean. We further showed that, in contrast to the lexical models, (at least many) verbs have variable argument realizations, the extent of argument variability differs across verbs, and variability is correlated with just how detailed a particular verb's lexical representation is. The less detailed a given verb's semantic specification, the more variability the verb allows in its argument realization and event interpretation, and the more the syntactic context contributes to the interpretation. Ritter & Rosen made two important points: (a) lexical semantics is not enough to explain the forces at work in argument mapping, and (b) verbs are often used in a fashion that violates the canonical assumptions about the lexical structure of the verb.

Various lexical approaches have been successful to the extent that they have linked event characteristics to both lexical semantics and argument position. But the lexical approach stops short of implicating the syntax in a way that makes full syntactic use of the compositional nature of events. The lexical approach has not explained what it is about subjects and objects that enables them to encode the seemingly critical event constituents of initiation or origination and delimitation.

4. Event structure as syntax

The recent work of Borer (1994; 1996), Benua & Borer (1996), Travis (1994; 1997; to appear), and Ritter & Rosen (1998; to appear) incorporated the findings of the argument-based studies of events showing that subjects encode initiation and objects encode delimitation. The same work extended argument-based efforts by proposing a syntactic representation of events that explains the relation between subjects and initiation and between objects and delimitation. In particular, the syntactic approach holds that the clausal functional projections determine the event structure of the sentence, and, with some variation across theories, that DPs receive both Case/agreement and event roles in the Spec of these functional projections. In other words, the syntactic approach to event structure equates the functional mechanisms of Case and agreement with the interpretive mechanisms of the components of the event — nominative Case subjects are interpreted as initiators and accusative Case objects are interpreted as delimiters. In short, events are seen as being specified in the syntax.

I will discuss three different syntactic models of event structure, those of Borer (Borer 1994; 1996; Benua & Borer 1996), Travis (1994; 1997; to appear), and Ritter & Rosen (1998; to appear). The three models differ in the exact details of the range of functional projections that encode event information as well as in the exact connections between event information and Case/agreement. But all three models encode the event properties (e.g. initiation and delimitation) within the clausal functional projections.

Borer (1994; 1996) argued that a given verb does not inherently belong to a particular lexical class (e.g. unaccusative versus unergative). She claimed instead that the verb projects into the syntax with any number of nominal arguments, unordered within the VP. The nominal arguments raise to the spec of particular functional positions, and the role each argument plays in the event is assigned by the functional heads.

As evidence that the syntax encodes the event, Borer discussed "variable behavior verbs", which behave like unaccusatives in some contexts and like unergatives in others. She used data from Dutch and Italian of the familiar auxiliary selection facts for unaccusatives and unergatives, from Italian regarding the behavior of the clitic *ne*, from Dutch regarding the impersonal passivization of a verb that is generally classified as unaccusative, and from Hebrew regarding a supposed unaccusative that actually allows a reflexive construction that normally is permissible only with external arguments. In each case, she showed that a single verb can behave either like an unaccusative or an unergative. The data, she argued, show that verbs do not determine whether their argument is external or internal. Instead, the position of the argument is determined in the syntax, and therefore the syntax determines the event characteristic of the predicate. Behavioral variability, Borer argued, is unexpected under the assumptions of a lexical approach to argument mapping.

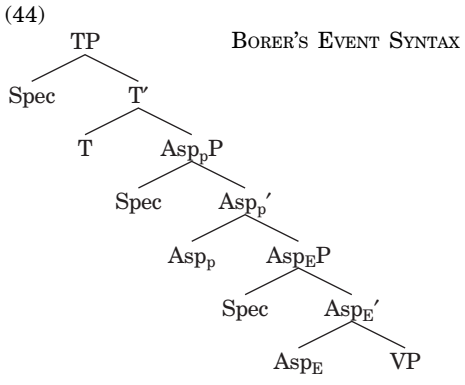
Borer explained her observation of variability by developing a syntactic account of events and argument projection, one in which the variable behavior is fully expected. In stark contrast to the lexical approach, the syntactic approach maintains that variable behavior is the norm.

A fundamental assumption of Borer's work is that the verb projects with any number of unordered nominal "arguments" (i.e., VP is not configurational), and that the arguments raise to SpecAspP in order to receive an event role, and possibly Case. Borer argued that the syntactic position of the subject and object determines the interpretation of the roles of these arguments, not the lexical representation of the verb. So, for example, the interpretation for (43b) might be odd, but we do give it the interpretation necessitated by the syntactic positions of the two arguments, assigning event instigation to the subject and delimitation to the object.

(43)
a. Bill ate the apple.
b. The apple ate Bill.

Borer (1994, 1996) and Benua & Borer (1996) posited that two event projections, Asp_P and Asp_E, dominate VP. These two projections are directly responsible for the eventive interpretation of predicates and their arguments by encoding the "aktionsart" distinction between activities and telic (delimited) events, and between initiated and non-initiated events. The model has shifted a bit in the course of its development and elaboration, but in their most recent work, Borer (1996) and Benua & Borer (1996) proposed a clausal structure like that in (44). A predicate is interpreted as an activity if $SpecAsp_P$ is filled, and as a result state (i.e. accomplishment or achievement) if there is an argument in $SpecAsp_E$.

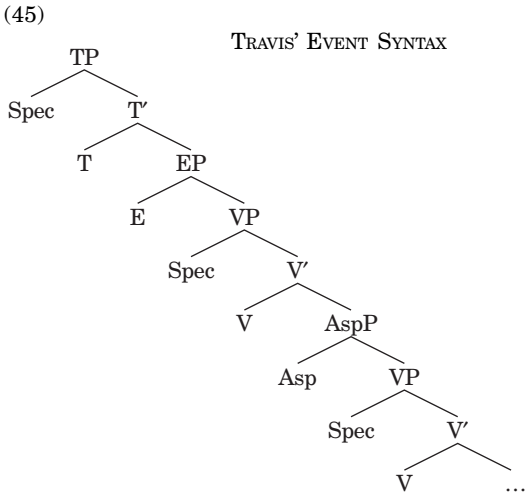
(44) Borer's Event Syntax



A further feature of Borer's model is that both AspPs in (44) are optional, but when they are present, their Specs must be filled by an argument. If Asp_EP is projected, there will be an argument in its Spec, which is the "subject of result". This is also the position in which accusative Case is assigned or checked (though not all subjects of result states receive accusative Case). Consequently, accusative Case is only available when the predicate denotes a delimited event. Similarly, if Asp_PP is projected, its Spec will be filled by the "subject of process" argument. However, because all clauses must have a subject, and because nominative Case may be assigned independently of this event role, Benua & Borer assumed that nominative Case is assigned in SpecTP.

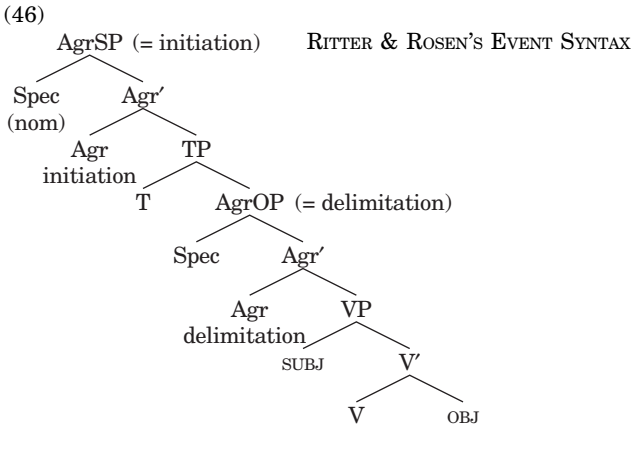
Travis (1994; 1997; to appear) independently proposed that events are encoded in the clausal functional projections and are related to the mechanism of agreement. Working largely with Malagasy and Tagalog, she argued that two functional projections encode the event – an Event Phrase (EP) dominated by T, and an AspP sandwiched between a VP shell (containing transitivizers, causatives and other such light "verbs") and the lexical VP. The details concerning the exact position of these functional projections have changed throughout the development of Travis' work, but the basic function of these projections has remained the same. In the most recent version of her work, AspP encodes delimitation or telicity, and EP binds the Davidsonian [e] of the verb's argument array and provides event information. Travis (to appear: 163) proposed the structure in (45). Her evidence for the existence and position of the functional projections AspP and EP included verb movement through Asp and object raising to SpecAspP in Malagasy, and the appearance of agents in SpecAspP in Chinese resultative "flip" constructions. Travis also argued that the AspP triggers agreement, a natural reflex of the spec-head relation of functional projections.

(45) Travis' Event Syntax



The work of Ritter & Rosen (1998; to appear) built on Borer's and Benua & Borer's work and is consistent with Travis' overall approach. Like Benua & Borer and Travis, Ritter & Rosen suggested that the event structure notions of initiation and delimitation are encoded in the clausal functional projections. We further suggested that AgrP — the functional projections responsible for Case and agreement — assigns the event roles of initiation and delimitation. For a canonical event (one with both initiation and delimitation), the subject moves to SpecAgrS and identifies the originator of the event; the object moves to SpecAgrO and identifies the delimiter of the event. Ritter & Rosen's syntactic model appears in (46).

(46) Ritter & Rosen's Event Syntax



Ritter & Rosen (to appear) further argued that, in representing eventhood, a given language only activates one of the FPs, either the initiating FP (AgrS) or the delimiting FP (AgrO). Languages vary as to whether activation of the initiating or the delimiting functor triggers an eventive interpretation of the clause: some languages treat any clause with an initiator as eventive, whereas other languages treat any clause with a delimiter as eventive. In initiation (I-)languages, activities and accomplishments have the syntax of events because both have an initiator; in delimitation (D-)languages, accomplishments and achievements have the syntax of an event because only accomplishments and achievements have a delimiter. Ritter & Rosen showed that languages make a structural distinction between eventive and non-eventive clauses, but what constitutes an "event" varies from language to language. We presented evidence that the classification of a clause as eventive is overtly marked through the Case and agreement features of the language, as detailed below.

D-LANGUAGES
Delimitation determines eventhood: accomplishments and achievements

I. Sensitive to semantic and syntactic properties of the object including
   – specificity or definiteness
   – Case marking
II. Accusative Case may be restricted to delimiting objects
III. Ergative splits on the basis of perfective aspect/past tense
IV. Object agreement not specified for person features

I-LANGUAGES
Initiation determines eventhood: accomplishments and activities

I. Sensitive to semantic and syntactic properties of the subject including
   – agentivity
   – animacy
   – person
II. Make a grammatical distinction between topic and subject
III. Ergative splits on the basis of properties of the subject
IV. Subject and object agreement specified for person features
V. Quirky Case subjects
VI. Animacy hierarchies

Ritter & Rosen hypothesized that a predicate in a D-language is eventive if and only if it is delimited; the delimiting FP (AgrOP) is specified. Accordingly, AgrOP is part of the syntactic representation of every predicate in a D-language and, in order for the clause to be syntactically eventive, a DP must raise into the specifier of AgrO. Because AgrO also contains the features for object agreement and accusative Case, these features are checked with those of the DP in SpecAgrOP. Ritter & Rosen argued that a non-delimiting object must remain inside the VP, where it receives inherent (e.g. partitive) Case. We suggested that AgrS in a D-language is not inherently specified with eventive content, so that initiation is only possible in the context of delimitation (Ritter & Rosen, to appear). In other words, in a D-language, an argument in SpecAgrS may be interpreted as initiating an event only if the clause is eventive, that is, only if SpecAgrO is filled.

In contrast, a predicate in an I-language is eventive if and only if it has an initiator; AgrSP (the initiating FP) is specified for eventive content. Consequently, a clause will be interpreted as eventive if a DP appears in SpecAgrSP. In an I-language, AgrOP (the delimiting FP) is not inherently specified for eventive content, so delimitation is only available when initiation is present. On this analysis, an argument in SpecAgrO will be interpreted as delimiting an event only if the clause is eventive, that is, only if SpecAgrS is filled.

Ritter & Rosen (to appear) presented cross-linguistic evidence showing that a host of characteristics of Case, agreement, verbal aspect, and object position follow from our analysis of the typology of languages and how the syntax encodes events. Regarding D-languages, we argued that various grammatical characteristics of the object and the availability of causatives correspond to the specification of delimitation in the language. Such grammatical characteristics include the restriction of causers to delimiting predicates in English (Ritter & Rosen 1998), the restriction of accusative Case to delimiting objects in Finnish (Kiparsky 1998), and the availability of delimiting objects to undergo object shift in Chinese BA constructions (Cheng 1988). In general, languages that determine eventhood on the basis of AgrO are sensitive to properties of the object such as definiteness, specificity, the mass/count distinction, and perfectivity. Regarding I-languages, we argued that various grammatical characteristics of the subject correspond to the specification of initiation in the language. Such grammatical characteristics include restrictions on nominative Case resulting in quirky Case subjects of non-eventive predicates in languages like Icelandic, ergative subjects in languages like Dyirbal and Inuit, VP internal subjects in Irish, and PP subjects in Japanese. Animacy restrictions on subjects, as found in some languages, may also be a reflex of initiation orientation. In general, I-Languages, which determine eventhood on the basis of AgrS, are sensitive to properties of the subject, including person, animacy, and agentivity.

The event syntactic approach as developed by Borer, Travis, and Ritter & Rosen offers several advantages over non-syntactic analyses. First, its syntactic nature provides a natural explanation for the compositional character of events. It has been noticed repeatedly that the entire predicate, including the verb, its arguments, and adjuncts, determines the event interpretation. For example, Dowty (1979) and Verkuyl (1993) said this within an event classification framework; the Davidsonian [e] was in part developed to take into account the role that modifiers play in the event, and Tenny (1994), Pustejovsky (1995) and others have argued that theories of the lexical mapping of events must take compositionality into account. The fact that event interpretation is compositional suggests that events are encoded somewhere in the syntax.

Second, the event syntactic approach implies that the mechanisms of Case and agreement correspond to interpretive material. The claim that the event is represented in the clausal functional projections entails the parallel claim that the mechanism of Case and agreement are not purely syntactic; instead the FPs encoding Case and agreement also contain semantic interpretation. The Borer, Travis, and Ritter & Rosen models of event syntactic structure differ somewhat technically as to the functional mechanisms and structural configuration, but all three models place at least some of the functions of Case or agreement within the event projections. In Government and Binding Theory and in the early versions of the Minimalist Program, the Agreement node largely performs the Case and agreement checking functions (in conjunction with T for checking nominative Case and V for checking accusative Case). Chomsky (1995) wrote that Agr, unlike all the other functional projections, has no interpretive component to it, and therefore its existence is not justified at any interface level. For this reason, he eliminated AgrP. If Ritter & Rosen's syntactic analysis is correct, then Agr does indeed have an interpretive component, and hence it is justified at LF and should be retained.

Third, the event syntactic approach provides a natural explanation for the special nature of subjects and objects in the interpretation of the event. The relevance to events of subjects and objects has been noted within the lexical literature (cf. Grimshaw 1990; Tenny 1994; van Voorst 1988) and within the logical semantic literature (cf. Krifka 1992). A basic assumption of the syntactic approach is that the functional projections checking Case and agreement of subject and object house the features of initiation and delimitation of events. Because initiation and delimitation features are checked in the same position as Case and agreement, it is to be expected that languages will grammaticalize properties of initiation and delimitation on the subject and object and that the subject and object in part determine the properties of the event is now explained.

Fourth, the event syntactic approach organizes observations of cross-linguistic variation in how languages deal with events. Languages may differentially focus on the subject or the object because either of the two components of an event can be syntactically specified by the language, as Ritter & Rosen (to appear) argued. The notion that a given language specifies either initiation or delimitation led Ritter & Rosen to a new and unified analysis of ergative Case, quirky Case, animacy hierarchies, person and other agreement systems, and accusative and partitive Case. It may also lead to an understanding of the syntax of secondary predication insofar as Ritter & Rosen (1988) have argued that secondary predication often delimits a predicate.

5. Unanswered questions and loose ends

Knowledge of the relations between the happenings of the world and the encoding of events in language has grown tremendously in recent years. Each approach to representing events that I have discussed views events from a different perspective, and each approach clarifies a different part of the overall problem of understanding the linguistic representation of events. In this final section, I outline some of the questions that remain and some directions that event structure research might explore.

Outside of the event structure literature, the term "aspect" refers to viewpoint (e.g. perfective or progressive). For the most part, event structure research has ignored viewpoint aspect. Recent work, however, has shown that perfectivity may be related to delimitation, which is, as we have seen, central to the analysis of events. For example, Kiparsky (1998) suggests that the perfective in Russian is tightly associated with delimitation. He shows that when the perfective appears on the verb, the predicate is interpreted as delimited; when the imperfective appears on the verb, the predicate is interpreted as non-delimited. Further, Vlatch (1981), Borer (1996), Demirdache (to appear) and others have claimed that progressives are stative rather than eventive: a stative generally cannot take the progressive, presumably because the progressive expresses an event as a state. In particular, Demirdache shows that progressives yield the same interpretation as other statives and non-delimited predicates in the so-called "out of control" morphology in Salish (a kind of anti-causative). Although "out of control" morphology may allow two readings, an ability reading and an accidental reading, it is only delimited predicates that are in fact ambiguous: non-delimited predicates allow only the ability reading. Critically, Demirdache reported that viewpoint aspect affects delimitation: when the progressive morphology appears on an otherwise delimited verb, only the ability reading is available. In effect, progressive morphology takes away the delimitation.

And so the question that needs to be asked is: What is the relation between viewpoint aspect and event structure? Demirdache & Uribe-Etxebarria (1998) proposed a set of clausal functional projections to encode viewpoint aspect. In and of itself, the fact that viewpoint aspect has the capacity to affect event structure (e.g., event/state or delimited/non-delimited distinctions) is good evidence that event structure is syntactically represented: Because viewpoint aspect is introduced in the syntax, its effect on the interpretation of the event must be realized in the syntax. If indeed event structure is represented in the clausal functional projections, then what is the (functional) structure of viewpoint aspect that causes it to interact with event structure?

Demirdache (to appear) also showed that

negation, generic adverbs ("always"), and modal operators ("will/might") affect the "out of control" interpretation of delimited predicates in Salish. Again, clausal functional elements interacting with event structure (delimitation) affect the interpretation of the predicate. Any theory of events must be syntactic (at least in part), and any syntactic theory of events must take into account the relation between the event and the other functional material.

A related question concerns the relation between the characteristics of the direct object and the event structure. One particular set of phenomena to be explicated is how the characteristics of the direct object tie in to the syntactic mechanisms that control event structure. The semantics literature has clearly established that characteristics of the direct object — the mass/count distinction, definiteness or specificity, bare plurals, generics, quantized noun phrases — influence delimitation and thus influence the event classification of the predicate. For example, Krifka (1989; 1992) worked out in detail the semantic relation between event classification and object reference, and Schein (1993) discussed the relation between events, parts of events, and plurality. Properties of the direct object, such as specificity, genericity, etc., are syntactically determined in the functional projections surrounding the nominal projection. The question this raises is: What is the relation between the functional properties of the object (the nominal functional projections) and the functional properties of event structure (the clausal functional projections)? Future work by Ritter and Rosen will address some of these questions.

Turning to semantic issues in the use of thematic roles, Parsons (1990) raised the question: Are thematic roles identical across verbs? Consider subjects, for example: although we call the subject of many verbs an agent, what the subject actually does varies considerably across verbs. Identifying event interpretation with functional projections resolves the variability issue in an interesting way. If arguments receive or check event roles in the syntactic structure, then what makes any given argument an "agent" (or, perhaps more accurately, an instigator of the action) is the same across verbs. And thus any difference between the agent of "kissing" and the agent of "killing" is purely due to the different lexical semantics of the two verbs, and not due to the syntactically-determined instigation. The subjects of both verbs are agents/instigators because both receive or check the initiator role in AgrS (that is, from whatever functional projection encodes the initiating role). So, for purposes of the syntax and the interpretation of the overall event, the two subjects are the same: they both initiate. For purposes of the specific meaning of the sentence, the two subjects are clearly different. In other words, the interpretation comes from at least two sources: the syntax of the sentence and the lexical semantics of the verb.

In view of the lexical semantics work of Jackendoff, Pustejovsky, and Levin & Rappaport Hovav, we must ask about the relation between the lexical representation (LCS) of a verb and the syntactic structure of an event. Even if (as I have argued) the event is largely encoded in the syntax, the event syntax is not entirely disconnected from the lexical semantics of the verb. The lexical semantics can constrain the event structures compatible with a given verb, and thereby constrain the syntax. For example, Tenny (1994) pointed out that in the locative alternation, either the theme or the location can be the direct object, and whichever is the object delimits the action. It is well-known that there are similar locational verbs that do not allow this alternation, as the examples in (47) and (48) show.

(47)
a. Terry poured water into the bucket.
b. *Terry poured the bucket with water.

(48)
a. *Terry filled water into the bucket.
b. Terry filled the bucket with water.

Within Borer's general approach, the syntax allows all of the sentences in (47) and (48), and one interprets as best as possible. For example, while (47b) is ungrammatical, it is still interpreted — the bucket is inundated with water. But the verb's LCS somehow determines the naturalness of the different constructions, and so *pour* is specified as not allowing the location to delimit the action. The LCS of a verb can constrain the syntactic structure, the event type, and the number and interpretation of the arguments. How and in what ways?

Another set of questions that this area must face is how syntactic studies of event structure will incorporate some of the advances made within the field of event classification. In particular, the features of initiation and delimitation do not quite correspond to Vendler's classification system: Are syntactic models weakened by their failure to encode the Vendlerian classes? What is the syntactic relevance of Vendler's four-way classification, and of the features that may underlie his classification? Is incorporating the features into syntactic models crucial for understanding the syntax and interpretation of events?

Turning to the field of logical semantics, what is the relation between the logical semantics of events and their syntactic representation? In particular, Davidson and his followers proposed that eventive sentences behave semantically as if there is an entity in their semantic representation that can be modified, quantified over, etc. Is there something in the syntax of events (perhaps a functional head of a some sort) that translates into the Davidsonian [e]? Would the precise functional head differ across languages, perhaps in a manner consistent with the cross-linguistic variation pointed out by Ritter & Rosen?

In this paper, I have reviewed three approaches to the problem of how events are represented. The three approaches differ with respect to what they try to represent. Semantic theories of event structure represent the event itself: the [e] included in the logical semantics of the predicate treats the event as a primitive semantic entity. Other approaches claim that events are composite and therefore try to decompose them, either by identifying sub-events (Pustejovsky; Grimshaw) or sub-properties of events (neo-Vendlerian classification approaches). Still other approaches associate the event with lexical or syntactic units, such as arguments (Tenny, van Voorst, Grimshaw) or functional projections (Borer, Travis, Ritter & Rosen).

Where, then, are events (possibly including sub-events and the properties of events) encoded? If the event can be quantified, and if quantification is calculated in the logical semantics, some form of event representation must be encoded in the semantics. If the meaning of the verb constrains event types, some form of event representation must be encoded within the lexicon of the verb. If the syntactic functional features are sensitive to the event, some form of event representation must be encoded in the syntax. Thus it is possible that events are represented in all three components of the grammar. The relations among the separate representations in the three components remain to be discovered.

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RECENT ISSUES IN LINGUISTICS

Elan Dresher

Invasion of the Language Viruses

Time was when one could write a book about language learning or the evolution of language without taking into account the linguistic theories of the day. This has been changing, thanks to the work of Noam Chomsky over the past forty years, and to writers like Ray Jackendoff (1994), David Lightfoot (1982), and Steven Pinker (1994), whose books have established the relevance of linguistic theory to mainstream discussions of human psychology and the nature of the mind. Judging from a recent book by Terrence Deacon, however, there is still a long way to go before the actual contents of linguistic research penetrate beyond the circle of its practitioners and become common currency in the wider intellectual culture.

Deacon's *The symbolic species: The co-evolution of language and the brain* is an impressive tour de force through neuroscience, ethology, palaeontology, anthropology, evolutionary theory, and much else. The blurbs on the back cover proclaim this to be a "superb and innovative look at the evolution of language" and "the best book yet written on the evolution of language." "*The Symbolic Species* should transform the foundations of the human sciences." Ralph L. Holloway, an anthropologist who has reviewed the book in *American Scientist*, writes that it is "a nonpareil", "just leaps and leaps above other evolution-of-language books published during the past five years."

Despite its brilliance, Holloway imagines that there will be parts "picked at by linguists", and no wonder. Before we have even opened the book we read that "Deacon has mounted a serious challenge to the neo-Chomskians... This is theoretical dynamite, planted deep under the walls of the neo-Chomskian fortress." The picking, not to mention the hurling down of arrows, stones, and burning oil, is well underway in Derek Bickerton's review in *New Scientist*. Needless to say, it will continue here.

Deacon's book is divided into three parts. The first part, to which we will return shortly, is on language. Part two is full of interesting information on the brain, including a survey of the neural bases of language and speech. Part three, "Co-Evolution," is quite literally science fiction in the strict sense of the term, in which Deacon advances a scenario for how the transition to language and symbolic reference might have occurred in early hominid communities.

With respect to language, Deacon (102 ff.) accepts the claims of linguists that language learning presents a very difficult problem, and he presents a respectable version of the argument from the poverty of the stimulus that children's experience does not suffice to account for their acquisition of language. Nevertheless, he believes that "innate Universal Grammar is a cure that is more drastic than the disease." Though he agrees that "human brains come into the world specially equipped" to acquire language, he rejects the "preformationist" interpretation of innateness as involving an innate "language competence", or "rules in the brain."

If neither experience nor innate principles explain language acquisition, where else can the required grammatical knowledge be? Deacon proposes (105) that "the extra support for language learning is vested neither in the brain of the child nor in the brains of parents and teachers, but outside brains, in language itself." In other words (109), "Children's minds need not innately embody language structures, if languages embody the predispositions of children's minds!"

Why did nobody think of this before? Perhaps because this position appears to have untenable, not to say absurd, consequences. Deacon is undeterred; languages are like living organisms that must be studied in evolutionary terms. He goes on (111): "In some ways it is helpful to imagine language as an independent life form that colonizes and parasitizes human brains, using them to reproduce." Languages "might better be compared to viruses... [which are] minimally packaged strings of DNA or RNA."

Deacon invokes the name of August Schleicher, an important nineteenth century linguist who viewed languages as natural organisms, like plants or animals. As Lightfoot (1999: 35, 227) points out, Schleicher (1863) was influenced in this regard by Darwin. Deacon takes up Darwin's idea that languages tend to change under pressure of natural selection in the direction of having shorter, "easier" forms (Darwin 1874: 88-92). Deacon stresses (109): "Languages don't just change, they **evolve**...Languages are under powerful selection pressure to fit children's likely guesses" [emphasis in original — BED]. Thus, languages are easy for children to learn because they evolved in such a way that they match children's biases. "The key to understanding language learnability...lies in...language change." (115)

David Lightfoot's new book, *The development of language: Acquisition, change, and evolution*, sets out to show that this view — that the principles of language are to be sought in a theory of change — is a major fallacy that has deep roots in the nineteenth century, the "century of history", and continues to influence some linguistic research to this day. This view is mistaken because languages are not plants or animals, or even viruses. They have no DNA, they do not pass through fixed stages of development from infancy to death. Even asserting that "they" do not do these things is not quite correct: there is simply no "they" there that can have these properties.

Moreover, contrary to Deacon's repeated assertions, there is not a shred of evidence from language change that languages evolve. The language faculty may well have evolved, and for all we know languages at some distant prehistoric stage may have been different from modern languages. However, we cannot reach any such hypothesized pre-languages through the study of language change or the reconstruction of any ancient or proto-language accessible to us.

One might well wonder what it is that Deacon finds so unacceptable about the notion of innate universal grammar (UG) that he would rather leap into this particular abyss. Indeed, what is the difference between endowing children with UG and attributing to them certain biases or predispositions to guess? Deacon writes with such authority about so many technical subjects that one is reluctant to say this, but there is a hollow space at the linguistic core of this book. In the places where concrete linguistic examples ought to be, Deacon gives us analogies and parables: Languages are like user-friendly Macintosh computers that are easy to operate; or a language is like a rigged Roulette wheel that consistently lands on numbers that an unwitting gambler tends to bet on.

In contrast to his discussion of the brain, which is admirably clear and precise, Deacon's references to grammatical principles are extremely vague. According to him, the theory of UG posits "axiomatic rule systems" that specify "grammatical operations", and invariant "deep structures" or "deep grammatical logic." Deacon argues (333) that these "deep" principles of UG are highly variable at the surface, and so they could not have evolved specific neural supports, and "are ineligible to participate in Baldwinian evolution!"

Elsewhere, however, he suggests (339) that "the best candidates for innate language adaptations turn out to be some very general structural characteristics of ...speech, and the computational demands this medium imposes when it comes to symbolic analysis." But many proposed principles of UG have a computational and structural character, and they may well be associated with invariant (though not necessarily transparent at the surface) cues. Thus, even if we agree that every aspect of UG must be adaptive, as required by Baldwinian selection (but see Lightfoot 1999: 243f. for some UG conditions that may be maladaptive), we must reserve judgement about whether UG could have evolved until we have put some concrete examples on the table. And until spelled out further, we may suspect that the difference between "UG principles" and "children's biases" are largely terminological.

Terminology may also be responsible for Deacon's distaste for the notion of a "language organ" or special linguistic faculty. He appears to interpret such terms as implying that language came about through the addition of some special component to the primate brain, like plugging in a graphic card to a computer. There is, of course, no neuroanatomical support for this view, but UG theorists never intended this image to be taken literally at the neural level.

I think we can come to a compromise here. Linguists will agree to replace the phrase "X is an innate principle of UG" with "X is a persistently lucky guess resulting from an unavoidable and ubiquitous innate bias." For their part, the evolutionary neuroscientists will put the language viruses back in the jar.

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THE PHONOLOGY AND MORPHOLOGY OF ROMANIAN GLIDES AND DIPHTHONGS: A CONSTRAINT-BASED APPROACH

by *Ioana Chitoran*
reviewed by *François Dell*

Summary
by *the author*

This dissertation provides a comprehensive descriptive analysis of the synchronic phonology and morphology of Romanian, focusing on vocalic segments (vowels, glides, and diphthongs). The analysis proposed is couched in the framework of Optimality Theory (OT) (Prince & Smolensky 1993; McCarthy & Prince 1993, 1995). Unlike the majority of studies written in this framework, which compare similar facts across languages, the present research is an in-depth investigation of one linguistic system with all its complexities, thus testing predictions made by the theory, and its ability to account for a wide range of different phenomena within one language.

I begin in section 1 by introducing the data which will be accounted for. In section 2 I summarize the analysis I propose for the stress system of Romanian, crucial for the understanding of glide-vowel alternations. In section 3 I investigate the environments in which glides surface, and I propose an analysis to account for their occurrence. In section 4 I account for the vowel/diphthong alternations (e~e̯a, o~o̯a). An acoustic study, presented in section 5, supports the description of the linguistic facts, as well as the phonological analysis proposed. The conclusions are presented in section 6.

1. The data

The vowel inventory of Romanian is given below.

(1)

vowels:	i	ɨ		u
	e	ə	o	
		a		
(glides:	j			w)
(diphthongs:	e̯a			o̯a)

I argue that the glides and diphthongs do not have phonemic status.

Alternations between vowels, glides, and diphthongs are very pervasive in Romanian, and are involved in the most salient phonological processes of the language. There is an asymmetry between [j] and [w] with respect to syllable structure. I note the more restricted distribution of the back glide [w] relative to [j]. As shown in (2), [j] surfaces as an onset and as a coda, both word-internally and word-finally.

(2)

onset [j]		coda [j]	
jar.nə	'winter'	kuj	'nail'
po.ja.nə	'grove'	haj.nə	'coat'
pja.trə	'stone'	kojf	'helmet'
a.mja.zə	'afternoon'		

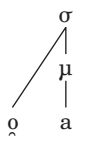
The back glide [w], however, surfaces only in a subset of the environments in which [j] is found. Thus, [w] is a word-initial onset only when preceded by a consonant and only in a series of loanwords, followed by [a]. It surfaces as a coda only word-finally.

(3)

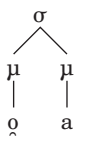
onset [w]		coda [w]	
---		bow	'ox'
pa.wu.zə	'pause'	---	
kwarts	'quartz'	---	
a.kwa.re.lə	'watercolor'		

For the diphthongs, three possible representations can be proposed: one in which the glide belongs to the onset (4a), one in which the glide belongs to the nucleus and shares a mora with the following vowel (4b), and one in which the glide and the vowel belong to a bimoraic nucleus (4c).

(4)

a. 

b. 

c. 

The representation in (4a) predicts that either the onset or the nucleus part of the diphthong may participate separately in alternations. The fact that in most cases, the diphthongs alternate morphologically with the vowels [e] and [o] argues against (4a). The representation in (4c) predicts that syllables containing diphthongs have extra weight. This prediction is not supported by any independent evidence.

I argue that (4b) captures the phonological facts, notably that the diphthong functions as a single unit. The representation is supported by the distinction in syllable structure between diphthongs and glide-vowel sequences, similar to the one found in French. Obstruent-liquid-glide (OLG) onsets are disallowed in French. Existing OLGV syllables have been explained by treating the GV portion as an underlying diphthong contained in the nucleus. The same restriction on OLG onsets is found in Romanian:

(5)

	complex onsets (diphthongs)		no complex onsets (glide-vowel)		
French	tʁwa	'three'	tʁi.jɔ̃f	'triumph'	*tʁjɔ̃f
Romanian	bro̯as.kə	'frog'	bri.joʃə	'bread roll'	*brjoʃə
	pre̯aʒ.mə	'closeness'	pri.jeten	'friend'	*prjeten

These data support the syllable structure proposed in (4b), where [e̯a] and [o̯a] constitute diphthongal syllable nuclei.

In the following sections I present the analyses I propose to account for the distribution of glides and diphthongs in the type of data illustrated here. I begin by investigating the stress system of Romanian.

2. The stress system of Romanian

Romanian stress is described in traditional grammars as being entirely lexical. I argue against this view, showing that it is to a large extent predictable, with a small set of lexically marked exceptions. The complexity of the system is due primarily to its close interdependence with the morphology of the language, to mismatches between prosodic and morphological constituents.

In the case of primary stress, there is evidence that no foot structure is built, but that stress is assigned by right edge prominence. The analysis of secondary stress is independent from that of primary stress. In particular, there is evidence that secondary stress does make use of feet. Neither type of stress is weight-sensitive. The stress domain includes the stem (root and derivational material), and excludes inflections.

Stress falls on the final or penultimate syllable of the stem, as illustrated in (6a) for verbs, and in (6b) for nouns and adjectives.

(6)

a. Verbs		
$[root]_{stem}$ inflection	[a.dún]j	'you gather'
	[á.per]j	'you defend'
$[root$ - **thematic V**$]_{stem}$ inflection	[kɨnt - **á**]j	'you were singing'
	[adun - **á**]se-m	'we had gathered'
b. Nouns and adjectives		
$[root(\text{-}deriv)]_{stem}$	[kəmáʃ]ə	'shirt'
	[kəməʃ - úts]ə	'shirt' dim.
	[albástr](u)	'blue' (MASC. SG.)
	[pépen]e	'watermelon'
	[gálben](u)	'yellow' (MASC. SG.)

Lexical items with penultimate stress on the root are fewer and less productive than those with root-final stress. I therefore consider the latter pattern to be the unmarked one. It is predicted by the constraint ranking **Rightmost(ǵ) >> Non-Finality**. **Rightmost(ǵ)** (Cohn & McCarthy 1994) requires that the main-stressed syllable be final in the prosodic word. **Non-Finality** (Prince & Smolensky 1993) prevents the last syllable of the prosodic word from bearing stress.

The marked pattern is reminiscent of the extrametricality rule (Hayes 1981, 1995). I argue that the marked pattern with penultimate stress is lexically marked for no prominence on the final syllable. To account for it, I propose an Identity constraint , IDENT<σ>, which ensures that the lexical marking in the input form is maintained in the output. In this particular case it requires that a syllable underlyingly specified as non-prominent should not surface with prominence. A single constraint ranking accounts for the marked and unmarked patterns of Romanian stress:

(7)
IDENT<σ> >> **Rightmost(ǵ)** >> **Non-Finality**

In longer words, secondary stress falls on the initial syllable, whether light or heavy, and on alternating syllables up to the main stress, avoiding clash.

(8)

(ò.pe) rét - ə	'operetta'
(à.nes) te.zí - je	'anesthesia'
(kòn.ta) (bì.li) tát - e	'accounting'

I argue that secondary stress is assigned independently from primary stress, by trochees built from left to right, up to primary stress. The pattern is predicted by the further interaction of the constraints in (7) with constraints referring to foot structure. FTBIN requires binary feet, FOOT-FORM(Trochaic) requires a left-prominence foot, PARSEσ requires all syllables to be parsed into feet, and **Align-Left(Ft,PW)** requires all feet to be aligned with the left edge of the prosodic word. The constraint ranking established for the stress system is:

(9)
FTBIN >> IDENT<σ> >> Rightmost(ǵ) >>FOOT-FORM(Trochaic) >> Non-Finality >> PARSEσ >> Align-Left(Ft,PW)

In the next section I discuss the forms in which the surface alternation between high vowels and glides is determined by the location of stress.

3. The distribution of glides

Some of the surface glides in Romanian are derived from underlying high vowels, and some are epenthetic, homorganic with one of the underlying vowels in the sequence. In either case, the role of glides is to prevent hiatus in an underlying sequence of two or more vowels. The presence of glides is predicted by the high ranking constraint ONS, which requires all syllables to have an onset.

In most cases the choice beween an epenthetic or non-epenthetic glide is determined by the location of stress. Thus, in (10a) /i/ in the final syllable of the root is stressed, and hiatus is resolved by a homorganic glide. In (10b) hiatus is resolved by gliding unstressed /i/.

(10)

a.	unmarked stress pattern	/ha.ín - ə/	[hajínə]	'mean' (FEM. SG.)
b.	marked stress pattern	/há <in>-ə/	[hájnə]	'coat'

I discuss epenthetic glides in 3.1, and non-epenthetic ones in 3.2.

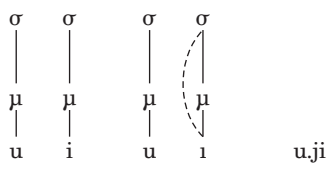
3.1. Epenthetic glides

To account for the homorganic glide in (10a) I propose a high-ranking constraint, PARSEμ(ǵ), which requires the vowel of the head syllable of the prosodic word to always project a mora.

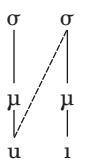
Given the seven-vowel system of Romanian, there are 49 logically possible combinations of underlying two-vowel sequences. Not all of these combinations occur. By looking at the surface realizations of all existing underlying VV sequences, I note that the sequence may surface with an epenthetic glide (*/u i/ > [uji]*), as a vowel-glide sequence (*/ui/ > [uj]*), or as a glide-vowel sequence (*/i o/ > [jo]*). In monomorphemic forms the occurrence of [w] is more restricted compared to [j]. The quality of the epenthetic glide is determined by the second vowel in the sequence, if that vowel is high. Otherwise the glide is homorganic with the first vowel. I show below the proposed representations for the preferred structure when the second vowel is high.

(11)

a.



b.



I propose that (11a) is preferred because it satisfies an alignment constraint, **Align(Seg, Left; Syll, Left)**, which requires the left edge of every segment to be aligned with the left edge of a syllable.

This constraint is violated when the second vowel is not high: /i o/ surfaces as [ijo], not *[iwo]. The output is predicted by the interaction of the alignment constraint with an identity constraint between the input and output forms of a vowel, IDENT-IO(V): IDENT-IO(V) >> **Align(Seg, Left; Syll, Left)**. The ideal homorganic glide is therefore one which shares **all** features with the input vowel.

Notice, however, that whenever hiatus is resolved by the projection of an epenthetic glide rather than by gliding, both underlying vowels project moras, violating a lower ranking constraint. I propose that the violated constraint is *STRUC (based on Prince & Smolensky 1993; Zoll 1993), which ensures that no extra structure, in this case moraic, is added to the representation.

The interaction of these constraints accounts for the occurrence of epenthetic glides, at least in the native, core vocabulary (cf. Itô & Mester 1995). Forms belonging to non-core strata of the vocabulary behave differently, and are accounted for by constraint-reranking.

3.2. Non-epenthetic glides

The occurrence of non-epenthetic glides, derived from underlying high vowels, is driven by similar pressures: to avoid hiatus and to minimize structure by preventing high vowels from projecting moras.

The same effect could be achieved by deleting one of the vowels, but would violate MAX-IO$_{stem}$, by not parsing a segment from the input stem. Evidence is found for two instantiations of the constraint MAX-IO, a specific one, highly ranked, referring to the segments of the stem, and a general one, lower ranked, referring to the entire prosodic word. Thus, the ranking ONS >> MAX-IO$_{stem}$ >> *STRUC accounts for the presence of word-initial glides ([jobág] 'peasant'), word-internal glides ([hájnə] 'coat'), and word-internal intervocalic glides ([dujós] 'tender').

An additional factor must be considered in the discussion of word-final glides, post-vocalic and post-consonantal. The analysis must account for the fact that the desinence vowel surfaces in some words, but not in others. The relevant data are given below:

(12)

unmarked stress pattern:	/skati - u/	[skatíw]	kind of bird
	/lup - u/	[lúp]	'wolf'
	/lup - i/	[lúpʲ]	'wolf' PL.
marked stress pattern:	/stu<di>-u/	[stúdju]	'study'
	/piso<i>-u/	[pisój]	'kitten'

I argue that final high vowel desyllabification and deletion are driven by the prosodic weakness associated with the word-final position. The constraint I propose to account for these facts relies on the Peak Hierarchy of Prince & Smolensky (1993). ***P/i,u#*** prevents word-final high vowels from being parsed as syllable peaks. It affects only high vowels, which already have intrinsically weaker intensity, and lower sonority. This constraint, which is apparently language-specific, can be the result of collapsing the two universal constraints, ***P/i*** and ***P/u***, and a word-edge alignment constraint. The data are accounted for by the ranking:

(13)

ONS >> MAX-IO$_{stem}$ >> *STRUC >> MAX-IO >> NOCODA

Generally, morphologically complex forms show no restrictions on gliding. The constraint ranking proposed for monomorphemic forms can account for these data, as well. An interesting case is that of vowel-initial suffixes attached to /i/-final roots. These forms can surface with either an epenthetic, or a non-epenthetic glide. I argue that the difference can be explained by a tendency to minimize allomorphy, captured by the constraint **Uniform Exponence** (Kenstowicz 1995). In this case, the effect of the constraint is to minimize root allomorphy in related noun, verb, and adjective forms.

4. Vowel-diphthong alternations

A set of very common vowel alternations is found in the native vocabulary of Romanian, involving mid and low vowels, and the diphthongs [e̯a] and [o̯a]:

(14)

ə -- á	kárte	'book'	kərt-itʃíkə	'book' (DIMINUTIVE)
e -- e̯á	be̯át	'drunk'	bets-ív	'heavy drinker'
o -- o̯á	po̯ártə	'gate'	port-ár	'gatekeeper'

We see a tendency for the stressed vowel to be low.

Previous synchronic accounts of the dipthongs are based on their historical analysis, thus missing an important generalization. I depart from these analyses, and I treat [e̯a] and [o̯a] as low vowels, arising from the lowering of mid vowels under stress. As such, the diphthongization of mid vowels is no longer a singular phenomenon in the phonology of Romanian, but is part of a more general process of vowel lowering.

I argue that Romanian stress is sensitive not only to the distance from the edge of the prosodic word, but also to the inherent acoustic salience of vowels. To capture the generalization that stress placement affects vowel quality, I propose a series of three binary constraints, whose relative ranking predicts the preference for low vowels under stress:

(15)

*STRESS[+high] >> *STRESS[-high] >> *STRESS[low].

Diphthongization/lowering under stress is sometimes blocked by factors related to vowel harmony:

(16)

harmony triggered by /i/	singular	plural		
	kárte	kártsʲ	'book'	*kártsʲ
	se̯árə	sérʲ	'evening'	*se̯árʲ
	flo̯áre	flórʲ	'flower'	*flo̯árʲ
harmony triggered by /e/	be̯átə	béte	'drunk' (FEM.)	*be̯áte
(does not affect o -- o̯a:	ko̯ástə	ko̯áste	'rib')	

These facts are accounted for by the interaction of Identity constraints with the *STRESS constraints and with two harmony constraints (**Harmony[+hi]**, **Harmony[e]**). The analysis I propose relies crucially on the simultaneous evaluation of surface stressed vowels by these three sets of constraints. The resolution of the three conflicting pressures is more easily captured in a constraint-based analysis, while a derivational account is more problematic.

5. The phonetics of glides and diphthongs

Two phonetic studies are carried out. One is primarily an acoustic description of glides and diphthongs. I begin with a preliminary study of the high vowels [i] and [u], and of glides in different environments. I compare the formant values of [i] and [j]. F1 is significantly lower for [j] than for [i], suggesting a narrower constriction in the articulation of the glide.

A comparison of epenthetic and non-epenthetic glides reveals a statistically significant difference in vowel-to-glide intensity ratio. Epenthetic glides have a significantly lower ratio, thus their own intensity is higher, closer to that of vowels.

The second study is an integrated perception-production study of [e̯a] and [o̯a], which tested native speakers' ability to distinguish between the two diphthongs and the very similar glide-vowel sequences [ja] and [wa], respectively. The acoustic study revealed duration differences and differences in the overall spectral shape between diphthongs and glide-vowel sequences. [e̯] in [e̯a] is significantly shorter than [j] in [ja]. This suggests that [e̯] is not a vowel, a separate segment. Phonologically, this can be interpreted as meaning that [e̯] is sharing the same position in the syllable structure with another element, supporting the representation proposed in (4b), and the phonological analysis in section 4.

The perception experiment showed that native speakers can correctly identify the sequences [ja] and [e̯a], but not [wa] and [o̯a]. The phonological difference between [ja] and [e̯a] is therefore reflected in the phonetics, but not the one between [wa] and [o̯a]. The acoustic parameters in which a significant difference was found between [ja] and [e̯a] are total duration, the F2 onset value, and its transition rate. No significant differences are found in these parameters for [wa] and [o̯a]. I argue that this neutralization is due in part to the shorter acoustic distance between the back vowels [u] and [o], compared to [i] and [e]. It may be that the acoustic difference between the front vowels allows sufficient acoustic space for two front glides, [j] and [e̯], but among back vowels there is only enough space for one round glide [w]. The effect of lip rounding reduces the distance between the first two formants, further limiting the acoustic space.

6. Conclusions

Three major issues emerge from the systematic study of one linguistic system: the status of exceptions in language, the implications of the proposed analysis for phonological theories, and the usefulness of an integrated phonetic and phonological study of the data.

When dealing with only one phonological system, exceptions are more visible, and the need to account for them is more compelling. In my study I come across two major kinds of exceptions: one in the stress system of Romanian, the other in the surface realization of glides. In my analysis of the stress system (section 2), I identify a marked and an unmarked pattern of primary stress in monomorphemic words. I explain the data by positing lexical prespecification (cf. Inkelas, Orhan Orgun & Zoll 1994) of the root-final syllable in the marked pattern, and by assuming that a specific

constraint (IDENT<σ>) makes reference to the prespecification. The constraint captures the same facts as an extrametricality rule, except that it is not restricted to peripherality. It predicts that identity to lexical marking can occur anywhere in the word, not only at the edge of a domain. The second main case of exceptionality involves glide formation and diphthongization. They are sensitive to the internal structure of the lexicon, to the core-periphery distinction.

As far as the theoretical framework is concerned, a constraint-based approach presents some clear advantages over a derivational one, especially in doing away with the intermediate stages of derivations. The parallel constraint evaluation assumed by OT eliminates the need to posit these abstract intermediate forms, and allows us to capture directly certain facts which, presented derivationally, posed serious theoretical problems (e.g. vowel lowering and diphthongization in section 4). On the other hand, an OT analysis may seem less elegant when dealing with segmental facts presented here, such as vowel harmony.

The integrated perception-production study of diphthongs and glide-vowel sequences revealed a complex relationship between phonological and phonetic representations. [e̯a] and [o̯a] have parallel phonological, but not phonetic, behavior. This valuable information would have been missed by looking only at the phonology. The case discussed here is a good example of the way in which phonological and phonetic information complement each other. The facts argue for the "hybrid methodology" advocated by Kingston & Beckman (1990) in determining the relationship between the phonological and the phonetic components, with both components providing equally valuable linguistic information.

Review by *François Dell*

After a general assessment of the work under review, I concentrate on two points which raise questions of interest for linguistic theory. The first concerns the characterization of hiatus-breaking glides within moraic representations of a particular kind. The second point deals with one aspect of the interaction between stress and gliding which suggests that intermediate levels of representation are needed in phonology.

Ioana Chitoran presents a synchronic account of vocoids in one of the lesser-studied Romance languages. Her exposition is very well organized and should be easy to read even for people who, like the present reviewer, are without any previous knowledge of Romanian. The facts are usually laid out in a clear and systematic fashion, and discussions of the previous literature on Romanian phonology and morphology at various points of the text enable the readers to get an idea of the current state of research on the phonology of Romanian. This careful empirical study should make very profitable reading for anybody interested in the phonology of vocoids or that of Romance languages.

Since in Romanian the surface distribution of glides and that of diphthongs are shaped by prosodic structure, Chitoran's disquisitions on these topics are preceded by investigations of syllable structure and stress assignment. Before showing that the location of primary stress in words is to a large extent predictable from their morphological make-up, she provides in a few pages (pp. 47–64) an outline of Romanian inflectional and derivational morphology which is a model of clarity.

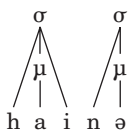
The author sets out to derive all the high vowels and glides which occur in the surface forms of Romanian from an underlying segment inventory with only two high vocoids /u/ and /i/; all the input forms in her analysis are strings of phonemes with no prespecified prosodic structure. The task is quite a challenging one. The situation in Romanian is of an order of complexity comparable to that found in Spanish, where it is necessary to prespecify the syllabicity of certain high vocoids in the lexical representations (see e.g. Roca 1997). Whether Chitoran actually succeeds in avoiding lexically prespecified syllabicity for Romanian will depend in the end on the viability of her use of lexical strata and on the ability of her account to accomodate the exceptions which she dutifully records at various points of her text (see e.g. pp. 30, 41, 84, 164, 186, 197, 211) but does not try to fit into her analysis.

Denying herself the comforts of an underlying contrast between high vowels and glides forces Chitoran to scrutinize very closely her data for regularities. The general framework within which she operates is that of Optimality Theory. Although one tenet of OT, as expounded in Prince & Smolensky's (1993) monograph, is that constraints are universal, the author devotes little space to discussions of whether the constraints she invokes reflect cross-linguistically favored patterns. Some of the new constraints she proposes are actually quite parochial (e.g. the harmony constraints of pp. 258–262) and it is clear that they are intended primarily as descriptive devices. Rather than to improve the theoretical framework she is working with, it seems that Chitoran's concern has been to use it as a tool to chart the empirical ground as systematically and insightfully as possible, and in the process she provides detailed data on various phenomena of general interest, for instance the assignment of primary and secondary stress by independent mechanisms, the dependencies between the quality of the hiatus-breaking glides and that of the adjacent vowels, gliding and its interaction with primary and secondary stress, the greater propensity of /i/ than /u/ for gliding or becoming a secondary articulation in consonants, diphthongization as a special case of lowering in stressed syllable and its inhibition by vowel harmony, the fact that *ja* is perceptually distinct from the diphthong *ea* while *wa* is not from the diphthong *oa*, lexical strata due to borrowings from various languages. Theoretical linguists of all persuasions should find much interesting material to mull over in Chitoran's excellent study.

1. Spreading onto onsets in moraic representations

To characterize syllable structure Chitoran adopts moraic representations in which codas that do not contribute to syllable weight and onsets are linked directly to syllable nodes. The representation of *hˈajnə* 'coat', for instance, is that given in (1).

(1)

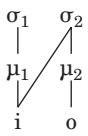


In this mode of representation the only thing which distinguishes onsets from other nonmoraic segments is their relation of precedence in time with respect to the segments linked to μ. In the first syllable in (1) *h* is an onset because it precedes *a*, which is linked to μ, while *i* is not an onset because it does not precede *a*.

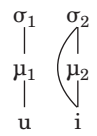
In Romanian the epenthetic glides which break up vowel sequences always borrow their features from one of the vowels in contact, e.g. /io/ → *ijo*, /oa/ → *owa*, /oe/ → *oje*. This is good justification for considering glide epenthesis as the result of feature spreading. According to Chitoran the representations of *ijo* (from /io/) and *uji* (from /ui/) are as given below in (2a) and (2b). Nodes are numbered for ease of reference.

(2)

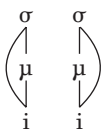
a. *ijo*



b. *uji*



c.



In (2a) and (2b) the presence of an epenthetic yod is represented by the association line between *i* and node σ_2.

In Chitoran's analysis the constraint which plays a decisive part in the insertion of hiatus-breaking glides is ONS, which requires syllables to have onsets. It is clear that the second syllable in (2a) has an onset, but it is not so obvious for the second syllable in (2b). Recall that in the representations adopted by Chitoran, to be an onset a segment must be linked directly to a σ node and precede a segment linked to a mora dominated by that σ node. *i* meets these conditions in σ_2 in (2a): it is linked directly to σ_2 and it precedes *o*, which is linked to μ_2, a mora dominated by σ_2. But what about *i* in (2b)? *i* is indeed linked directly to σ_2, but does it precede a segment linked to μ_2?

For the answer to be "yes" we must assume that *i* precedes itself, i.e., that in the sense relevant here "precede" is a reflexive relation. Now syllable σ_2 has on onset. That syllable is reproduced in (2c), together with its mirror image. That the two diagrams in (2c) differ in their left-right orientation is irrelevant from the point of view of linguistics. They are but equivalent ways of depicting the same phonological object (the same phonological representation) in a two-dimensional plane. For the same reason as it must be considered as having an onset, that object must be considered as a closed syllable in which *i* acts as a weightless coda, as it does in the first syllable in *hˈaj.nə* (see (1)). The two interpretations of the direct link between *i* and the σ node (onset yod and coda yod) must be exclusive of one another for otherwise the diagrams in (2c) would have to be equivalent ways of representing the syllable *.jij.* and we would not be left with any means of representing a syllable whose peak shares its associated feature bundle with only one margin (i.e., *.ji.* or *.ij.*).

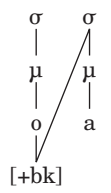
To sum up, the two diagrams in (2c) are equivalent graphic depictions of a phonological representation in which a feature bundle is linked at the same time to a μ and to the σ dominating μ. For such a representation to make sense, there must be no contradiction involved in taking the relation of precedence in time between bundles of distinctive features (i.e., between the root nodes of feature-geometric trees) as a reflexive relation. The representation can then be construed as corresponding either to *.ji.* or to *.ij.*, two options which exclude one another.

If taking "precede" as a reflexive relation leads to contradictions, one way to avoid these would seem to be to use moraic representations like those advocated in Hayes (1989), in which only the segments in the onset are linked directly to the σ node; the segments which follow the syllable peak and do not contribute to syllable weight are linked to the last mora of the syllable rather than to its σ node. This change would presumably require significant modifications in Chitoran's analysis since in that analysis as it presently stands morae linked to two segments are only used to represent the diphthongs *oa* and *ea*. In any case Hayes's moraic representations also pose problemes of their own when they are used to characterize successive positions in a syllable which are linked to the same feature bundle, see Rubach (1998).

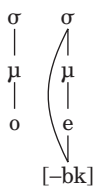
When the vowel which projects a hiatus-breaking glide is nonhigh, its [-high] specification does not spread to form an onset because glides are [+high]. (3a) and (3b) are the representations resulting from glide epenthesis in /oa/ and /oe/ according to Chitoran (pp. 130 and 135).

(3)

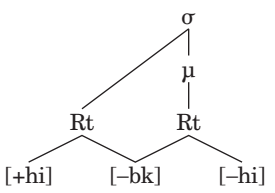
a. *owa*



b. *oje*



c.



Chitoran gives diagrams (3a) and (3b) as characterizations of optimal outputs in her OT tableaux. As in (1) and (2) the phonetic symbols *o*, *a* and *e* are stand-ins for bundles of distinctive features.

The insight which guides Chitoran's account of glide epenthesis in Romanian is that it uses as much as possible feature specifications already present in the input representations. The diagrams in (3a) and (3b) immediately raise two questions. First, how do they represent the fact that the epenthetic glides are [+high]? The sequence *oje* (from /oe/) portrayed in (3b) is presumably homophonous with the sequence *oje* which derives from /oie/ (p. 206) and in the latter sequence the medial segment is [+high] both in the input and in the output (for the features of vocoids in Chitoran's analysis see p. 242). Second, and more important, the diagrams in (3a,b) imply that the associations between the prosodic nodes and the individual feature specifications need not be mediated by the roots of feature trees, which widens enormously the range of representations allowed by Universal Grammar. Can we avoid such a proliferation while preserving Chitoran's insight about glide epenthesis?

We can by taking (3c) as the represention of *.je.* in the realization of /oe/. Only the nodes which are relevant here are displayed in (3c). "Rt" stands for the root node of a feature tree. The appearance of [+high], which is absent from the input /oe/, can be seen as a consequence of the high ranking of the family of constraints *M/a>>*Me,o, which Chitoran invokes to exclude nonhigh vocoids from syllable margins (p. 146).

The syllable in (3c) has an onset even if the relation of precedence between root nodes is not taken to be reflexive. The only difference between the epentheses in *uji* (from /ui/) and *oje* (from /oe/) is that the [-high] specification of /e/ cannot be carried over into the glide because glides must be [+high]. Could one not attribute to *.ji.* in *uji* from /ui/ a representation analogous to (3c), i.e., a representation in which *.ji.* would have an onset even if the relation of precedence between root nodes is not reflexive? This is not possible, because in (2c) the symbol *i* itself stands for a root node. On the other hand, attributing parallel representations to the surface reflexes of /ui/ and /oe/ would not present any problem if we were using representations of syllable structure such as those advocated by Levin (1985), in which the relation between the bundles of distinctive features and syllable structure is mediated by a sequence of skeletal slots.

2. The interaction between primary stress and gliding

One of the three major conclusions that Chitoran draws from her work is that OT is superior to frameworks with serial derivations: OT eliminates the need to posit intermediate representations. Since Chitoran does not back her contention by comparing the merits of the competing frameworks over some specific set of data, it is up to the readers to scour her text for areas which might provide suitable testing grounds.

One area where the odds seem to be in favor of OT is the set of regularities which relate the feature content of a hiatus-breaking epenthetic glide to the quality of the abutting vowels (pp. 117–142). Another is the interaction between secondary stress and gliding (pp. 164–176), which involves a case of "anti-bottom-up construction" akin to that documented for Lenakel by Rosenthall (1997). On the other hand the interaction between gliding and **primary** stress provides evidence in favor of levels of representation intermediate between the input and the output, as I will now argue.

In a word primary stress is either on the last syllable of the stem or on the penultimate. There is a lexical distinction between two classes of morphemes, (a) those which allow their last syllable to be stressed, and (b) those which do not. The latter receive stress on their penultimate syllable when they occur as the last morpheme in a stem. Chitoran invokes a constraint Rightmost(ˈσ) (p. 75), which in effect requires the stressed syllable to be as near as possible to the end of the stem. The morphemes of class (b) have their rightmost vocoid marked in the lexicon as nonprominent. Vocoids so marked are unable to receive (primary) stress, in virtue of a constraint IDENT<σ> (p. 89) which is ranked above Rightmost(ˈσ). The difference between the words with stem-final stress and those with stem-penultimate stress is illustrated in (4) and (5).

(4)

a.	albˈastru	/albastr]u/	'blue'	(p. 92)
b.	drˈagoste	/drag<o>st]e/	'love'	(p. 92)

(5)

a.	awˈud	/aud]u/	'I hear'	(p. 144)
b.	dˈawunə	/da<u>n]ə/	'damage'	(p. 144)

A right bracket indicates the end of the stem and vocoids which are lexically marked as nonprominent (i.e., unable to bear primary stress) are enclosed in angled brackets.

The two high vocoids do not behave in the same way in the environment /V—C/. In that environment /u/ surfaces as a vowel regardless of the location of stress, see (5), where the glide before *u* is epenthetic. In the same environment /i/ surfaces as a vowel if it is stressed and as a glide otherwise, as illustrated in (6):

(6)

a.	hajˈinə	/hain]ə/	'mean, FEM'	(p. 184)
b.	hˈajnə	/ha<i>n]ə/	'coat'	(p. 184)

The glide which precedes *i* in (6a) is epenthetic. The problem with Chitoran's analysis resides in her account for (6a) and similar forms. Rather than look at her account directly it is convenient first to see how the forms in (5) and (6) would be derived in an analysis with serial derivations. Steriade (1984) proposes such an analysis. I am citing from a preliminary version of that article, which I presume does not differ much from the published version. The derivations in question would look something like those in (7):

(7)	(5a) /aud]u/	(5b) /da<u>n]ə/	(6a) /hain]ə/	(6b) /ha<i>n]ə/
syllabification	a.u.d]u	da.<u>.n]ə	ha.i.n]ə	ha.<i>.n]ə
stress	a.ˈu.du	d'a.u.nə	ha.ˈi.nə	h'a.i.nə
desyllabification				h'aj.nə
other rules	a.wˈud	d'a.wu.nə	ha.jˈi.nə	h'aj.nə

Dots stand for syllable edges. Steriade's analysis has been modified slightly for the sake of expository convenience but the modifications have no bearing on the issue in discussion. Like Chitoran, Steriade does not posit an underlying contrast between high vowels and glides. The input strings must first undergo syllabification so as to enable the stress rule to operate. The output of the stress rule is subjected to a rule which desyllabifies certain high vowels and makes them part of the preceding syllable. Only unstressed vowels can be affected by the rule, which is why *i* is desyllabified in *hˈa.i.nə* but not in *ha.ˈi.nə* (the reason why *u* does not undergo desyllabification in *dˈa.u.nə* needs not concern us here). Other rules apply subsequently, among them glide epenthesis, which breaks up certain vowel sequences.

Chitoran and Steriade agree that the difference between trisyllabic *ha.jˈi.nə* and disyllabic *hˈaj.nə* must ultimately be traced to a lexical difference identical to that in pairs (4) and (5), and the evidence for that assumption is compelling. In Steriade's account the stem of *hˈaj.nə* 'coat' is indeed disyllabic and stressed on the penultimate syllable of the stem at an earlier stage of the derivation. As a result of desyllabification stress is located on the last syllable of the stem in *hˈaj.n]ə*, as it is in *ha.jˈi.n]ə*.

In the OT framework, which does not allow intermediate representations, the fact that at the surface level stress occurs on the last syllable of the stem in both forms presents a problem which Chitoran's account leaves unsolved, as we shall now see.

In Chitoran's analysis of Romanian all syllables are unimoraic, i.e., only syllable peaks are associated with a mora. High vowels are moraic while glides are not. The pressure for high vocoids to surface as glides is due to constraint ONS, which requires syllables to have onsets, and to *STRUC, a constraint which incurs a violation for every occurrence of μ in a representation. *STRUC is at loggerheads with constraints *M/u and *M/i, which incur a violation for every occurrence of /u/ and /i/ which is not linked to a mora. The ordering of the constraints directly relevant to this discussion is given in (8).

(8)

IDENT<σ> >> RIGHTMOST(ˈσ) >> *M/u >> *STRUC >> *M/i

Let us first look at the forms in (5) and (6b). Stress is assigned so as optimally to satisfy IDENT<σ> and RIGHTMOST(ˈσ), as explained earlier. /u/ surfaces as a vowel because *M/u is ranked above *STRUC, and it projects an epenthetic glide to comply with ONS, which is highly ranked. The difference between (6b) and (5b) comes from the fact that *M/i is ranked below *STRUC whereas *M/u is ranked above it. Whereas the constraint against nonmoraic /u/ is stronger than that against creating morae, the latter overrides the constraint against nonmoraic /i/. /ha<i>n]ə/ yields *hˈaj.nə* rather than **ha.jˈi.nə* (the output parallel to *da.wˈu.nə*) because *ha.jˈi.nə* incurs a fatal violation of *STRUC.

We can now turn to (6a), which is problematic for Chitoran's analysis. Contrary to what the author writes (see esp. tableau (210) on p. 149) the constraints and their rankings in her analysis do not predict *ha.jˈi.nə* as the surface form of /hain]ə/, for there exists a better candidate, viz *hˈaj.nə*, the same surface form as that in (6b), whose prosodic structure, minus stress, is displayed in (1). The relevant tableau for (6a) is (9). The arrow indicates the optimal candidate.

(9)

	/hain]ə/	**RIGHTMOST(ˈσ)**	***STRUC**	***M/i**
(a)	ha.jˈi.nə		* * * !	
(b) →	hˈaj.nə		* *	*

To circumvent this problem the author proposes the high-ranking constraint PARSEμ(ˈσ), "which ensures that stressed vowels do not glide" (p. 143). The configuration prohibited by PARSEμ(ˈσ) is one in which a stressed σ dominates an unparsed μ. Contrary to what we read on pp. 148–149, ranking PARSEμ(ˈσ) above *STRUC does not make *ha.jˈi.nə* a better candidate than *hˈaj.nə*, for *hˈaj.nə* does not contain the configuration prohibited by PARSEμ(ˈσ): (1) does not contain any unparsed μ. It is difficult to see how constraint PARSEμ(ˈσ) could be reformulated to satisfy the author's needs.

What constraint PARSEμ(ˈσ) is meant to achieve is to prevent a stressed vowel from becoming a glide, i.e., to prevent the peak of a stressed syllable from losing its mora. This goal is a meaningful one in a framework with serial derivations, in which a segment can acquire a mora at one stage in the derivation and lose it at a later stage. But things are different in a framework in which intermediate representations do not exist. In (9), given that *i* is stressed neither in the input nor in the possible output (b), the presence of stress on (a syllable whose peak is) *i* is simply not a factor which can be taken into consideration in evaluating candidate (b).

Analogues of the Romanian situation should not be too difficult to find in other languages. A similar challenge to the OT framework would be posed by any language in which (i) stress is not already specified in lexical representations, and (ii) in a given context desyllabification (i.e., gliding or deletion) affects all the occurrences of a certain vowel except those under stress.

The two questions raised in this review cast doubt on views held at present by many people about moraic representations and about the nature of phonological derivations. Chitoran's dissertation, and the vocoids of Romanian, will have a role to play in discussions of these issues in coming years.

Acknowledgment
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LICENSING EMPTY NOUNS IN FRENCH

by *Petra Sleeman*

reviewed by *Yves Roberge*

Summary
by *the author*

Since Chomsky (1982), the licensing of small *pro* has generally been related to inflection. It was proposed that subject *pro* was only possible in languages with a **rich enough** inflectional system, so that the inflection could provide the grammatical features of the **missing subject**.

The **licensing of *pro* by rich inflection** approach has been adopted by several linguists to explain noun ellipsis facts (see, among others, Kester 1996). It was proposed that adjectival inflection could license ellipted nouns. This claim was especially made for the Germanic languages, in which the noun can very easily be left out in the presence of an inflected adjective. Consider the Dutch examples (1a) and (1b):

(1)
a. Ik nam de oud**e** (auto).
I took the old (car)
b. Ik heb een oud *(huis).
I have an old (house)

In this dissertation, it is claimed that besides licensing by rich inflection in the Germanic languages, there is another way of licensing *pro* in the case of noun ellipsis, operative in at least the Romance languages and in English.

The dissertation focuses on French. In French, inflected adjectives do not always allow noun ellipsis:

(2)
*De ces filles, je préfère l' intelligent**e**.
of these girls, I prefer the intelligent (one)

Barbaud (1976) enumerates a small class of adjectives that allow noun ellipsis: superlatives, ordinals, color adjectives, the adjectives *seul* 'only', *autre* 'other', *même* 'same', *précédent* 'preceding', *suivant* 'following', *prochain* 'next', and some qualifying adjectives such as *grand* 'big' and *petit* 'small'. These adjectives license noun ellipsis, even if they are uninflected. All other adjectives, even if they are inflected, do not, see (2):

(3)
a. De ces garçons, Paul est le plus intelligent.
of these boys, Paul is the most intelligent (one)
b. De ses livres, je préfère le troisième.
of his books, I prefer the third

Noun ellipsis in French is also licensed by quantifiers. In the dissertation, it is therefore claimed that in French only elements with a partitive meaning, i.e. elements which create a subset, license empty nouns. A distinction is made between two kinds of partitives: inherent partitives, which have the function of creating a subset and non-inherent partitives, which denote a set themselves, which is not necessarily a subset. Non-inherent partitives are color adjectives and qualifying adjectives such as *grand* and *petit*. It is shown that the qualifying adjectives that license noun ellipsis in French are semantic primitives that make cognitively relevant distinctions (Dixon 1977), which make the adjectives **partitive enough** to license noun ellipsis. All other adjectives enumerated above and quantifiers are inherent partitives.

It is shown that noun ellipsis can only be licensed by elements that properly govern the empty noun. It is therefore assumed that the elements that license empty nouns are generated in functional projections of NP. Since in French **postnominal** adjectives such as the color adjectives can also license noun ellipsis, it is assumed (following Valois 1991 and others) that these are also generated in a functional projection of NP, where they can license the empty noun. The **postnominal** position of adjectives in French is the result of the movement of a lexically filled noun.

In the thesis, pronouns such as *celui* 'this one, that one', *quelques-uns* 'some', *lequel* 'which one', etc., are also analyzed as cases of noun ellipsis. It is proposed that the pronouns themselves are generated in functional projections of NP, where they license the empty noun just as cardinals and a small group of adjectives in French do, viz. by partitivity. It is argued that pronouns are inherent partitives. They necessarily create subsets. A distinction is made between inherent partitives that create a proper subset, such as *quelques-uns* 'some', and inherent partitives that create an improper subset, such as *tous* 'all'.

It is claimed that in English, Italian and Spanish noun ellipsis is also licensed by partitivity. But whereas in French a small group of qualifying adjectives can license empty nouns, it is shown that in English, Italian (at least in some varieties) and Spanish, noun ellipsis is only licensed by inherent partitives.

Italian and Spanish both have two noun ellipsis constructions. In the first construction, the same inherent partitives as in French license noun ellipsis:

(4)
a. Un altro *pro* è sulla tavola.
another (one) is on the table
b. Tomo un otro *pro*.
I take another

It is argued that in the second construction the pronouns *quello* or *uno* in Italian or *el* or *uno* in Spanish, which are inherent partitives generated within the functional system dominating NP, license the empty noun, with the adjective being generated in the position of a DP-internal predicate (see also Rizzi 1979, Cinque 1990). Since it is the pronoun and not the adjective that licenses the empty noun, this construction allows all kinds of adjectives, as opposed to the first construction:

(5)
Preferisco quello *pro* intelligente.
I prefer the one intelligent
'I prefer the intelligent one'.

(6)
a. Se casó con el *pro* inteligente.
herself married with the intelligent
'She married the intelligent one'.
b. He leido uno *pro* interesante.
have read one interesting
'I read an interesting one'.

Even for the Germanic languages it is proposed that besides adjectival inflection, partitivity can license empty nouns. This happens in the case of quantifiers, such as cardinals, which do not inflect.

The licensing requirement on empty nominals consists of two parts. The empty noun has to be formally licensed and has to be identified (Rizzi 1986). In the thesis, it is proposed that empty nouns in French are formally licensed if they are properly governed by an element with a partitive meaning. As for the identification, it is proposed that only elements with a "specific" interpretation are able to identify empty nouns, because only a specific interpretation makes linking to a superset in the domain of discourse possible, so that the semantic content of the missing noun can be recovered. In French, indefinite subjects generally have a "specific" interpretation but indefinite objects do not (Diesing 1992). This accounts for

the fact that noun ellipsis is possible in indefinite subjects but not in indefinite objects, unless a partitive PP is added, which makes the DP "specific", see Enç (1991):

(7)
Trois *pro* étaient absents.
three were absent

(8)
Je connais trois *pro* *(de ces livres).
I know three (of these books)

It is proposed that besides a partitive PP, the quantitative pronoun (*en* in French) can also make a DP specific. It is shown that the quantitative pronoun is also licensed by elements with a partitive meaning. Therefore the claim is made that the quantitative pronoun *en* is the specific counterpart of NP *pro*: both are licensed by partitivity. The quantitative pronoun is used if a derivation with *pro* is not possible, which is the case if *pro* cannot be identified because it is within a non-specific DP. This explains why the quantitative pronoun is only used in combination with DPs introduced by a "weak" determiner or pronoun, but not in combination with a "strong" determiner or pronoun:

(9)
a. Il en$_i$ a lu un meilleur t_i / *le meilleur t_i.
he of it/them has read a better (one) /the better (one)
'He has read a better one/the better one'.
b. Il en$_i$ connaît quelques-uns t_i / * chacun t_i.
he of it/them knows some / all
'He knows some/all of them'

In languages without a quantitative pronoun, such as English or Spanish, there is no subject/object asymmetry. It is argued that in languages that lack an overt quantitative pronoun to make indefinite nounless DPs specific, indefinite DPs containing NP *pro* can get a specific interpretation even in object position, because the empty noun has to be linked to an antecedent:

(10)
a. I have taken two *pro*.
b. Quiero dos *pro*.
I want two

Finally, it is proposed that even at the level of the word, empty nouns in French are licensed by adjectives with a partitive meaning. It is proposed that "substantivized" adjectives such as *le malade* 'the sick person' have a word-internal syntactic structure, consisting of an adjective and an empty noun. It is shown that even at the level of the word, adjectives need to have a partitive meaning (in an extended sense) in order to be able to license the empty nominal head of the word.

Review
by *Yves Roberge*

Petra Sleeman's dissertation constitutes an important contribution to the study of missing syntactic constituents in general and to the concept of ellipsis in particular. While concentrating on empty nouns, it also provides a detailed examination of the internal structure of DPs especially with respect to the positions occupied by adjectives. One should not be mislead by the title of this dissertation which only makes reference to French. This dissertation is much more than a simple analysis of French nounless DPs, it judiciously includes many Romance and Germanic languages and provides detailed and sound accounts of the variation observed among them. The extended abstract of the dissertation given above provides a summary of the main conclusions. For my part, I would first like to present an outline of the five chapters which make up the dissertation before discussing some specific aspects.

Chapter one lays down the theoretical assumptions on which Sleeman has built her analyses. The DP-hypothesis is discussed in detail and a multi-headed structure is adopted, following work by Abney (1987) and others. This structure provides for an NP dominated by various functional projections such as, among others, DP, QP and NumP. Adjectives being among the putative licensers for empty nouns, the question of their base position takes on a central importance. Following Cinque (1993), Sleeman assumes that all adjectives are generated within the Spec of functional projections structurally related to the NP. Chapter 0ne also provides a short section on the licensing and identification of *pro* based on Rizzi (1986) and Lobeck (1993, 1995) where it is claimed that, aside from the morphologically based phi-features, a more semantically based features, namely partitivity can license *pro* as the empty noun within a DP.

Chapter two represents the core of the dissertation. It examines French noun ellipsis constructions in detail before providing an account of the various licensing options available in Italian, Spanish and some Germanic languages. Noun ellipsis is defined as the omission of a noun that can be recovered from the context (syntactically or through the discourse). Sleeman's aim is to determine under what circumstances a noun can be omitted. While in many Germanic languages the phi-features morphologically realized on adjectives are sufficient (as is the case of the verbal inflectional morphology in null subject languages), this cannot be extended to French where adjectival inflectional morphology does not seem to play a crucial role in the licensing of empty nouns. Rather, it is shown, following others, that only a small class of adjectives and quantifiers can license empty nouns. Sleeman's main contribution is the generalization that licensing adjectives and quantifiers in French share a partitive meaning. Semantically, a partitive element is one which can create a subset; syntactically, it is represented as the semantic feature [+partitive]. This feature must appear on a functional head that properly governs the empty noun. Lexical items can further be either inherent partitives (creating a subset) or non-inherent partitives (creating a set). Languages vary as to which elements, inherent or non-inherent, can license empty nouns. As for the identification of the empty noun, a distinction is introduced between syntactic identification and interpretation. Syntactic identification of the empty noun or NP *pro* can be done by the partitive element only if it has a "specific" partitive meaning. Its semantic interpretation is given by a discourse antecedent.

In Chapter three, Sleeman uses Corblin's (1990) description of nounless DPs to extend the analysis proposed in the previous chapter to the pronouns that can license empty nouns in French such as possessive and demonstrative and the interrogative/relative pronoun *lequel* 'which one'. It is shown that these pronouns are all partitive and are generated in the Spec of functional heads above NP. Furthermore, only when these pronouns have a "specific" interpretation can they license *pro* making linking to an antecedent possible. Personal pronouns are also discussed in this chapter. For Sleeman, they are also Determiners that license an empty noun through partitivity although they can identify this empty noun by their specificity in some cases or by a [±human] feature in others.

The last two chapters deal with the quantitative French pronoun *en* and substantivized adjectives respectively. *En* is shown to be the phonological spell-out of *pro* in noun ellipsis constructions; it is used when some properties of the construction prevents the presence of *pro* such as a lack of specificity. The chapter on substantivized adjectives (*le malade* 'the sick (person)') must be analyzed as adjectives licensing an empty noun rather than as regular nouns. It is shown that the requirements stated in the previous chapters on the licensing of the empty noun also apply in substantivized adjectives but in the lexicon at the word level instead of the syntax.

Some aspects of Sleeman's work raise questions that are of central importance for syntactic theory. I consider some of them here.

Sleeman correctly points out in the first chapter that some researchers object to the DP hypothesis by pointing out that the head of a noun phrase is N, not D. According to this view, D should not project. To this objection, Sleeman answers following Grimshaw (1991) that both N and D must be heads, i.e. "the N-D system is a multiheaded extended projection" (Sleeman, 8). This is a perfectly valid and motivated approach; after all, a similar view has been put forth in the literature with respect to clause structure where I and V combine to create the familiar IP-VP sentential structure. Furthermore, just as IP can be "exploded" in various functional projections each with its own head, the DP in Sleeman's work and others is assumed to dominate and be dominated by several functional projections. The multiplication of functional projections is problematic for many syntacticians; cf. Janda and Kathman (1992) and one of the goals of current research is to provide clear criteria or principles following which an element can be considered as a functional category. One such criterion is that functional categories belong to closed classes of lexical items and/or morphological objects or parts of morphological objects such as agreement or pieces of agreement. In her dissertation, Sleeman states the following:

> In this study, I will assume that categories forming non-closed classes and with descriptive content are indeed possible within the functional system dominating NP, at least in the Spec of functional projections. I will also call these functional projections themselves QP and AP, after the specifier that they contain, but it might also be possible to give them another name. In any case, their head is (phonologically) empty. (p. 10)

One would have wished for a discussion of the implications of these assumptions. Nevertheless, her central proposal that the elements she defines as having a partitive meaning are in a sense responsible for the ellipted noun is certainly sound and on the right track and could be recast within a different DP or NP structure.

Another obvious issue is to determine whether nounless DPs do contain a syntactically represented null NP as *pro* or another empty category. Sleeman (30-31) discusses in some detail the nature of the missing noun as an N^0, N' or NP. The basic question (must the missing noun be represented by an empty category?) is not addressed directly (except in the case of *quelqu'un* 'someone' in chapter three). Within recently proposed approaches to syntax, for example Bouchard (1995), the semantic property of the licensing element, its partitivity, would be sufficient to account for the ellipted interpretation of nounless DPs, making it superfluous to merge an empty category within the DP. While it is fair (theory internally) to assume that *pro* corresponds to the missing noun, it would also have been preferable to provide independent empirical evidence to support the assumption. On the other hand, Sleeman's postulation that *pro* is the missing noun allows her to contribute in a significant way to the study of missing elements in general.

The notion of partitivity plays a crucial role in Sleeman's view of the licensing of *pro* in nounless DPs. Most of the previous analyses of missing arguments, more specifically null subjects and objects, similarly rely on features for the licensing and identification of *pro*. The features normally used are phi-features and sometimes Case. More to the point, the features used are usually morphologically based, i.e. they are at least in part morphologically realized on the licensing element. As we have seen, Sleeman shows that this is the case in nounless DPs in certain Germanic languages, as in (1) in her summary where only the inflected adjective can license an empty noun. In French, on the other hand, adjectival inflectional morphology plays no role; something else is at play. Lobeck (1993, 1995), which Sleeman uses as a point of departure, shows that the features [+plural] and [+possessive] license noun ellipsis in English. For her part, Sleeman replaces Lobeck's features by the feature [+partitive] which she assumes to be simply a semantic feature. We thus see a departure from most previous accounts of the licensing of *pro* from agreement morphology to plural and possession to partitivity. This is a significant shift since Lobeck's features maintain a

certain morphological basis while Sleeman's feature is purely semantic. Again, while this is not problematic in itself and will probably lead to the discovery of other semantically based licensing features, it does deserve further discussion on at least two levels. First, the question of acquisition, or how a native speaker internalizes the fact that some elements with a partitive meaning can license *pro*. Is there independent evidence for the class of elements at play? Second, the Minimalist Program (Chomsky 1995) relies heavily on features and feature checking to motivate syntactic operations and properties. I therefore look forward to further work by Sleeman on the exact nature of the partitive feature within a Minimalist framework. What is the relevance of the partitive feature at the interface levels compared to Chomsky's formal features? Is one feature on the licensing element sufficient or is a checking relationship involved? It could be the case, foe example, that the partitive feature must enter into a formal relationship with another element (the empty noun) as is proposed for the semantic feature NEG in Haegeman (1997). In other words, Sleeman has opened a possibility that needs further development. Rizzi's (1986) study of null objects in Italian shows that only "affected" objects can be null and of course not all verbs "affect" their object. This reliance on the semantic notion of affectedness is also quite a departure from licensing by agreement features and it would be interesting for Sleeman to explore possible links between partitivity within DP/NP and affectedness within IP/VP.

To conclude, the questions raised in this review should not detract from the fact that Sleeman's dissertation is a substantial contribution to the study of empty nouns and to the internal syntax of DPs in French. Further research on the licensing and identification of missing elements will undoubtedly benefit from Sleeman's insights and her hypothesis that the semantic notion of partitivity plays a major role in these operations.

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IS LOCAL ECONOMY MINIMALIST ENOUGH?

by *Toshifusa Oka*

reviewing Chris Collins' *Local Economy*

"But we are still a long way from a comprehensive theory of economy, a topic that is now being explored for the first time within a context of inquiry that is able to place explanatory adequacy on the research agenda," says Noam Chomsky in his *The Minimalist Program* (1995, 228). Collins' *Local Economy* is undoubtedly one of the most serious works towards a comprehensive theory of economy.

1. Local economy

1.1. Definition of local economy

In this book, Collins proposes that economy conditions on syntactic derivation are local in the following sense:

(1)
Given a set of syntactic objects Σ which is part of derivation D, the decision about whether an operation OP may apply to Σ (as part of an optimal derivation) is made only on the basis of information available in Σ. (p. 4)

Collins states,

In other words, the decision about whether to apply OP may not refer to another set of syntactic objects Σ' that is in D, or to what happens at LF and PF, nor to another set of syntactic objects Σ' that is in another derivation D'. (p. 4)

To see how an economy condition fails to be local, consider for example one of the most essential economy conditions which have been discussed since Chomsky (1991), namely, Shortest Derivation or Fewest Steps, which states that a derivation is blocked by a competing derivation with fewer steps. In order to apply this condition, two or more different derivations must be compared. Furthermore, only convergent derivations are assumed to count as competing. Whether or not a derivation converges, however, cannot be determined without examining its LF and PF. We don't know in advance at a point in the course of a derivation whether it is converging or not. Thus Shortest Derivation/Fewer Steps is not local but global in the sense of (1), so that it should not be able to count as a principle of language. This is one of the most illustrative examples.

1.2. Inversion

Collins argues for his proposal on empirical and conceptual grounds. The most striking empirical argument is based on inversion phenomena. Consider the following example of locative inversion:

(2)
a. John rolled down the hill
b. Down the hill rolled John

Here the verb is an accusative one with a theme DP and a locative PP, in which case an inversion applies optionally. In (2a) the theme DP is overtly raised to the subject position, namely Spec of TP, to satisfy the EPP feature of T. The Case and agreement features of T are also overtly satisfied by the raised DP. In (2b) the locative PP is raised instead, to employ the same number of overt movements as in (2a). It is assumed here that the EPP feature of T is somehow satisfied by raising of the PP. The Case and agreement features of T, however, have not yet been satisfied at Spell-Out in this derivation. Therefore there must be an additional step at LF to raise those features of *John* to T for checking. Shortest Derivation/Fewest Steps would incorrectly rule out the derivation of (2b) in favor of the one of (2a), a problem which will not arise if there is no global economy condition in the first place.

Collins assumes here that the derivations of (2a) and (2b) compete with each other under Shortest Derivation/Fewest Steps. One may think, however, that they might fail to compete so that Shortest Derivation/Fewest Steps will not enter here. This will be the case if (2a) and (2b) consist of different sets of lexical items, following the conventional assumptions concerning the comparison domain for economy. Thus it may be possible to assume that the structure (2b) has a different composition of T or an additional functional category to trigger the raising of a locative phrase. Having recourse to a lexical or structural ambiguity is a reasonable strategy to account for an apparent optionality. This kind of consideration, however, will not immediately weaken Collins' argument, because any approach employing a lexical/structural ambiguity will be responsible for making clear what it is. Collins' approach makes it possible to give a simple and straightforward account of the optionality of inversion without complicating the presupposed lexical/structural analysis. Locative inversion offers a good empirical argument against Shortest Derivation/Fewest Steps, leading up to local economy. Collins also show that what is termed "quotative inversion" provides the same line of argument, though it will require a somewhat more complicated structural analysis.

1.3. Global vs. local economy

Collins also argues that local economy is also theoretically desirable. He states,

Perhaps the strongest reason to adopt local economy is that it places a strong constraint on possible economy conditions. This sharply limits the theoretical possibilities in giving an economy analysis of any particular phenomenon, which is desirable. (p. 5)

In order to limit theoretical possibilities, however, adopting local economy is not the only option in this case. An alternative is to adopt global or anti-local economy: economy conditions are not local in the sense of (1). In other words economy conditions are designed in such a way that when the decision about whether to apply an operation at a point in the course of a derivation is not made only on the basis of information available at that point, but also by referring to a different point of that derivation or to a different derivation. These two alternative approaches are simply two options to take. We do not know a priori which is the right or better answer.

The above argument concerning inversion (section 1.2 above) provides an empirical justification for local economy. Collins gives a conceptual justification as well. This concerns Numeration. Chomsky (1995) takes Numeration to be a set of pairs (LI, *i*), where LI is a lexical item and *i* is its index, which indicates how many times LI is selected. He also proposes that Numeration determines the reference set for evaluating a derivation under economy: we only compare derivations which start with the same Numeration. Global economy, comparing derivations, cannot dispense with Numeration as far as it determines the reference set. Local economy, on the other hand, does not compare a derivation with alternatives and therefore does not have to fix the reference set, opening a possibility of eliminating Numeration from the grammar. Collins proposes to allow direct access to the lexicon in the course of a derivation so as to introduce lexical items into the derivation without Numeration. If Numera-

tion is an undesirable thing, it is better to eliminate it. Collins states,

> The presence of a Numeration in the theory of grammar is not necessary in the same way that the lexicon and the PF and LF interfaces are necessary. The Numeration is a purely grammar internal structure that is observed only through its (sometimes subtle) consequences for the observable structures generated by the grammar. In this sense, postulating a Numeration is a clear departure from minimalist assumptions, unless it can be shown that there is strong empirical evidence for it.

Elimination of Numeration will thus be very minimalist.

However, it is not necessarily impossible to eliminate Numeration under global economy. It will become possible if it is assumed that the reference set is determined by something else. We may turn our eyes from the starting point of a derivation to its goal, and assume that economy conditions only compare derivations converging at the same LF or at some LF that is similar in a manner to be precisely defined. (For proposals along these lines, see for example Oka 1993a, b, 1995, Collins 1994, and Ura 1995.) Or we might be able to *eliminate* Numeration while maintaining the assumption that it determines the reference set. Suppose we say that, as Collins proposes, lexical items can in principle be freely introduced to a derivation directly from the lexicon at any point of the derivation and that economy conditions only compares derivations which use the same set of lexical items the same number of times each. Then there exists no grammar-internal construct consisting of lexical items with their indices from which a derivation starts. In this sense we have eliminated Numeration. But the reference set for any derivation will be the same as before, and therefore there is still a concept of Numeration. If we use the same term, we are now just referring to a concept which is made use of for economy calculation, and not to a syntactic construct. Thus the argument concerning Numeration does not seem to support local economy so straightforwardly as it is expected to.

An argument against global economy may come from considerations of the computability problem. Chomsky (1995) argues,

> Considerations of economy of derivation tend to have a "global" character, inducing high-order computational complexity. Computational complexity may or may not be an empirical defect; it is a question of whether the cases are correctly characterized (e.g., with complexity properly relating to parsing difficulty, often considerable or extreme, as is well known). Nevertheless, it makes sense to expect language design to limit such problems. (p. 201)

> An elementary empirical condition on the theory is that expressions "usable" by the performance systems be assigned interface representations in a manner that does not induce too much computational complexity. We want to formulate economy conditions that avoid "exponential blowup" in construction and evaluation of derivations. (p. 228)

The simplest solution to the computability problem is to exclude global conditions. But it is not the only solution. There should be other ways to reduce computational complexity. Furthermore, as Chomsky (1995 Fall lecture) has pointed out, the discussion above presupposes that computational complexity does matter to the computational system of language. Whether it is indeed the case or not is an empirical question itself, which will ultimately have to be answered when we have better understanding of the computational system. Thus in the future arguments for global economy might possibly accumulate to show that computational complexity does not matter, an exciting discovery with a significant impact on other fields of inquiry as well.

An extreme assumption we are led to along the lines of Collins' reasoning will be that there exists no local or global economy condition on derivations at all, avoiding the potential problem concerning computability. Here I do not mean that there is no observed property of derivations that could be characterized in economy terms, but that the computational system of language does not have a general UG principle that is applied to evaluate the cost of derivations in a local or global manner. This approach more sharply limits the theoretical possibilities in giving an economy analysis of any particular phenomenon. A described property of derivational economy cannot be just translated as a global or local condition on derivations, but should be reduced to general considerations of essential constituents of the computational system such as the lexicon, the LF and PF interfaces, and syntactic operations.

To eliminate economy conditions as a whole is also a more minimalist move, because their existence can only be supported by theory-internal arguments based on empirical evidence. They are not uneliminable in the same way as the above mentioned essential constituents. The lexicon is necessary because there are lexical items. The LF and PF interfaces are necessary because language expressions are interpreted in two distinct modes: semantically and phonetically. Syntactic operations must include at least Merge and Move. Merge is necessary because linguistic expressions are composed of one or more lexical items. Move is made necessary by virtue of what Chomsky refers to as the "displacement" property of language: phrases appear in a position "displaced" from the position in which they are interpreted. All of these must be expressed in some formulation in any theory of language. We need operations to construct expressions, but do not necessarily need "extrinsic" conditions on their application.

2. Last resort and Minimality

Now let us see how Collins formulates economy conditions under local economy. He has two local conditions: Last resort and Minimality.

(3)
Last Resort
An Operation OP involving α may apply only if some property of α is satisfied. (p. 9)

(4)
Minimality
An operation OP (satisfying Last Resort) may apply only if there is no smaller operation OP' (satisfying Last Resort). (p. 9)

These two conditions are naturally defined on the lines of previous studies of economy. Both of them, however, are proposed to apply to Merge as well as to Move. Let us consider these in turn.

2.1. Move

In the case of Move, it is straightforward. Last Resort and Minimality are interpreted for Move as in (5) and (6), respectively.

(5)
Move raises to α the checking domain of a head H with a feature F only if the feature F of H enters into a checking relation with a feature F of α. (p. 67)

(6)
α can raise to a target K only if there is no operation (satisfying Last Resort) Move ß targeting K, where ß is closer to K. (p. 77)

These definitions are essentially the ones discussed in Chomsky (1995), where they are further incorporated in the definition of Attract, to which I will return.

As for locative inversion, it should be allowed by these conditions. Collins argues that the raising of the locative PP in (2b) satisfies Last Resort because the EPP feature of T will be in a checking relation with the categorial feature of the DP in the raised PP, which is a case of pied-piping, or with the categorial feature of the PP if the EPP feature can be in a checking relation not only with a D-feature but also with any categorial feature. Minimality will be satisfied on some natural assumptions concerning closeness and the VP structure.

2.2. Merge

In the case of Merge, Collins' argumentation is not so straightforward. He first defines Merge as in (7), redefining it later to cover movement.

(7)
Given a set $\Sigma = \{SO_1, SO_2, ..., SO_n\}$ and a subset Σ' (consisting of exactly two elements) of Σ, then Merge (Σ') is defined as the following complex operation:
i. make Σ' as a member of Σ (recall a constituent is just a set of constituents)
ii. define Head (Σ') = Head (SO) for some SO in Σ' (SO = syntactic object)
iii. remove the elements of Σ' from Σ. (p. 76)

Collins defines unrestricted Merge by removing "consisting of exactly two elements" from the above definition.

He proposes that the property that Merge must satisfy under Last Resort is Integration, which is defined as in (8).

(8)
Integration
Every category (except the root) must be contained in another category. (p. 66)

A question immediately arises: What kind of property is Integration? Surely it is not a semantic, phonetic or formal feature. Nor is it a property that a category may or may not have depending on its internal structure. Collins claims,

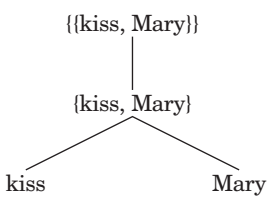
> This is a syntactic property of every constituent, lexical or not. It does not obviously follow from any semantic requirement. It could be considered one of the defining properties of the notion constituent. Every constituent must be a daughter of some other constituent (except the root). (p. 66)

> Last Resort should make reference to any property that is relevant to the internal operations of the syntactic computation. One of these properties happens to be feature checking; another happens to be dominance. (p. 67)

> As part of the definition of Last Resort, the relevant properties must be specified. In the case of Merge, the relevant property is Integration. In the case of Move, the relevant property of is that a feature of must enter into a checking relation. (p. 67)

Merge is also subject to Minimality. Collins claims, "In the case of Move, Minimality chooses the operation that has the shortest path of movement. In the case of Merge, Minimality chooses the operation that combines the smallest number of elements. (p. 77)" He argues that the binary branching property of phrase structure is reduced to Minimality so that Merge can be defined in the unrestricted form, noting that to create a ternary branching phrase, for example, we must combine more than two elements. However, given the definition (7), we can select one and only one element for merger, which is the case if Σ' is a single-member set. Suppose that Σ = {{the, man}, {kissed, Mary}} and Σ' = {{kissed, Mary}}. Then Merge (Σ') yields Σ = {{the, man}, {{kissed, Mary}}}. This creates a non-branching phrase as in (9).

(9)



Here Last Resort is satisfied with respect to Integration, because the phrase {kiss, Mary} is integrated in the larger phrase {{kiss, Mary}}. Collins argues,

> In fact, it should never be possible for any derivation to combine two elements, since merging a single element is the least costly operation. As a consequence, every utterance should consist of a single word (although that word may be arbitrarily deeply embedded). This is unacceptable, since one of the basic facts about language is that it allows for sentences. Therefore, we must stipulate that Merge has a requirement that the set S' it takes as an argument has two or more elements. This kind of stipulation, since it follows from the most basic considerations about empirical adequacy of the theory and since it must be made universally, seems to be a rather minimal departure from a system with no assumptions at all about the form of Merge. (p. 81)

A problem with this stipulation, however, is that it follows that every utterance should consist of more than one word. This too is unacceptable, because there is no reason that we may not make an utterance with one word, but with two or more. Note that non-branching phrases are not harmful as far as they do not keep branching phrases from being created. At LF they may or may not be interpreted properly. If not, linguistic expressions involving such a phrase will be just ruled out.

One of the best explanations of the binary nature of phrase structure is given by Kayne's (1994) antisymmetry theory, which has been basically adopted and further developed by Chomsky (1995) and others. The central principle is the LCA.

(10)
Linear Correspondence Axiom
d(A) is a linear ordering of T. (Kayne 1994: 6)

Asymmetric c-command imposes a linear ordering of terminals. If we have a ternary phrase, for example, the ordering will not be total with some terminals remaining unordered with respect to each other by virtue of failure of asymmetric c-command. Even if Merge is not assumed to be subject to Minimality, the LCA can make it possible to define Merge in the unrestricted form without any stipulation to permit merging one or two elements, but not more. Collins adopts the LCA as an independent principle so as to give a natural explanation to the Strict Cycle. The binary nature is now redundantly explained by the LCA and Minimality, which strongly suggests that one of these two should be abandoned. Considering independent motivations for the LCA, it doesn't seem unreasonable, contrary to Collins' claim, to exclude the assumption that Minimality is a general principle to apply to any operations, and therefore to Merge as well.

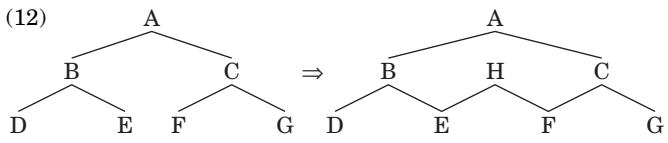
Let us turn back to Integration. Collins argues that Integration, which applies at every step in the derivation, is an independent condition that is not derived from any semantic requirement or from the LCA, which Chomsky (1995) has reformulated as a condition following Spell-Out. However, Integration can be considered to be in essence built in the definition of Merge itself. Given the definition (7), Last Resort is violated under Integration just in one trivial case. Suppose that the set Σ', the argument of Merge, is an empty set. Then no element is merged in this operation and therefore there is no element that can be claimed to satisfy any property for Integration, so that Last Resort is violated. This operation does not change the input Σ and is not detected at the LF and PF interfaces. (Note also that it will be inapplicable in the first place, given Collins' stipulation that Merge has a requirement that the set Σ' it takes as an argument has two or more elements.) Apart from this case, Merge is designed to necessarily satisfy Integration. The reason for all of this is that Integration is just a reflex of the irreducible fact that linguistic expressions are composed of one or more lexical items. In other words, linguistic expressions are organized into larger ones. Let us refer to this as the compositionality property of language. It is this compositionality property that motivates the existence of Merge in the computational component of language. Given minimalist assumptions, Merge should be motivated for its existence by the same kind of necessity as the lexicon and the LF and PF interfaces are motivated. The best way to guarantee that Merge is indeed motivated by the compositionality property is to optimize the definition in such a way that it incorporates this property but eliminates as much as possible. Is it necessary to motivate application of Merge in basically the same way as its existence is motivated? It is not. It will just yield redundancy. Now the assumption that Merge is subject to Last Resort is dubious, too. Excluding this assumption, Integration will become unnecessary for the theory, which is desirable because this property is merely a reflex of a more fundamental one and its presence in the course of derivations is not justified on independent grounds.

There is one more thing to consider to keep this line of argument. It is internal merger. Since it is clear that movement involves merger and applies to constituents embedded in larger constituents, Collins redefines the definition of Merge as in (11).

(11)
Given a set Σ = {SO_1, SO_2, ..., SO_n} and a set T every member of which is a member of Σ or constituent dominated by a member of Σ, Merge (T) is defined as the following operation:
i. make T as a member of Σ
ii. define Head (T) = Head (SO) for some SO in T (SO = syntactic object)
iii. remove the elements of T from Σ. (p. 82)

Now there arises another way in which Last Resort is violated by Merge, which Collins simply does not discuss. Suppose, for example, that T = {E, F}, where E and F are internal constituents of some SO. This merger is illustrated as in (12).

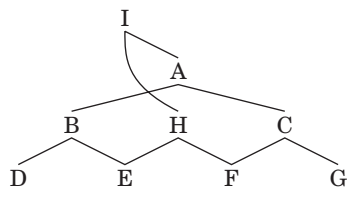
(12)



Last Resort is violated because both E and F already satisfy Integration prior to Merge. If the derived structure has to be ruled out but there is no way to do that other than to keep it from being derived in the first place, it will provide an argument for Collins.

Note however that the newly created phrase H must be ultimately contained by some phrase containing the phrase A, since both A and H are roots at this point and the derivation cannot converge until it yields one and only one root. The simplest way to accomplish that is to directly merge A and H, yielding the structure (13).

(13)



There is no obvious reason to rule out this structure by semantic interpretation. Ordering of terminals will be unsuccessful, however. H asymmetrically c-commands the constituents of A, or A asymmetrically c-commands the constituents of H, depending on whether I is projected from A or H, given Chomsky's (1995) phrase structure theory. Thus it must be the case that the terminals of H either precede or are preceded by those of A, given the LCA. But E and F are constituents of A and H at the same time. As a consequence, regardless of whether E and F are terminal or non-terminal, there will be some terminal preceding itself and some pair of terminals preceding each other, a contradictory ordering. Even if A and H are not immediately merged but incorporated later in the same phrase, the same result will obtain. As far as A and H are not in domination and E and F are dominated by both A and H at the same time, we cannot avoid a contradictory ordering of the terminals of E and F since it will be the case that some phrase dominating E and F asymmetrically c-commands another phrase dominating E and H. There are similar cases involving internal merger, but in any case terminals of an internally merged elements are not successfully ordered, aside from the case of movement, which avoids the problem by making a copy of a merged element. Thus internal merger does not provide a strong argument for the proposal that Merge is subject to Last Resort with respect to Integration.

3. Economy under Minimalism

Suppose that Merge is not subject to Minimality because an independent condition yields the same result as desired, and that it is not subject to Last Resort because the effect of Last Resort follows from the very nature of Merge itself. Then it is reasonable to expect that these two conditions will be made unnecessary as independent economy conditions also in the case of Move. This has already been done by Chomsky (1995). He proposes that Move = Attract + Merge, and that Last Resort and Minimality are part of the definition of Attract.

(14)
Attract
K attracts F if F is the closest feature that can enter into a checking relation with a sublabel of K. (Chomsky 1995, 297)

This essential operation for movement derives the effect of Last Resort by applying to formal features. This makes it possible for the theory to express more directly the minimalist idea of Chomsky that the displacement property of language is reduced to the existence of (uninterpretable) formal features. In searching for formal features, Attract is constrained in terms of closeness, deriving the effect of Minimality.

Collins, in contrast, insists that Last Resort and Minimality are general principles so that they should apply to both movement and pure merger, and claims,

If Last Resort and Minimality were parts of the de)nition of Attract (supplanting Move), then they would independently have to be part of the de)nition of pure Merge. Such a result would be odd. Both Attract and Merge would have exactly the same conditions built into them. (p. 25)

However, as we already know, his idea is not so well implemented. Though both conditions are claimed to be general, they are applied to different types of operations in so different manners. Last Resort refers to feature checking for Move, and to Integration for Merge. Minimality refers to the relative distance of movement, or to the number of merged elements. Collins argues,

The computational system looks at an operation and compares it to any operation with which it can be compared along the same dimension (shortest path, least number of elements, and possibly other dimensions). (p. 78)

However, the manners in which Minimality applies are so specific to the operations it applies to, that there will arise no significant case in which Merge blocks Move or Move blocks Merge under Minimality. If there were such a case, Minimality, comparing applications of two different kinds of operations, would be provided a justification for its generality. (Note that such an argument is found in Chomsky (1995), where it is proposed that Move (Attract+Merge) is more costly than (pure) Merge.) Thus it remains unsuccessful to assign a substantial meaning to the term "general."

Chomsky's approach is minimalist in that it makes the economy properties of movement derivable from an indispensable operation, escaping from postulating otherwise unnecessary conditions. Collins' approach is also minimalist in that it reduces the class of possible conditions by barring the postulation of global economy conditions. An approach that will be more minimalist than these two is to exclude local and global economy conditions altogether. This is not a trivial matter at all. It requires that we discover and understand economy properties of derivations and reduce them to independently motivated considerations in natural ways.

It seems more challenging, given the amount of already purported economy properties, but some of them have already been starting to be recast. Thus, the notion of Last Resort is not properly defined as a substantial condition on application of operations, but rather it may be better regarded as just expressing the minimalist idea that any postulation of a construct or structure must be first of all motivated by conceptual necessity. The notion of Minimality may have more substance, but it is only incorporated in the definition of Attract. Even if its effects are observable in derivations, it actually imposes a condition on the internal process of Attract. This condition can be considered as a specific form of locality, an essential notion that assumes various forms in various areas of language. One of the most influential global properties that have been discussed in Chomsky (1995) and others is Procrastinate. Collins does try to view this condition from a different angle, though I will not discuss his proposals for reasons of space.

So much is left for future research, but I hope that an optimal design of language will be that a minimal set of perfectly defined operations derive expressions by themselves, reminding us of the image of a *Self-playing Cello* on the cover of *The Minimalist Program*.

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The Third Annual Conference of the Gesellschaft für Semantik "Sinn und Bedeutung 1998"

University of Leipzig, December 11–13, 1998

by *Susan Olsen*

The third annual conference of the Gesellschaft für Semantik SINN UND BEDEUTUNG 1998 took place in mid-December at the University of Leipzig. The conference was organized by Anita Steube, Hannes Dölling and Andreas Späth (Department of General Linguistics) and Susan Olsen, Holden Härtl and James Witt (Department of English Linguistics).

After a cordial welcome by the Rector of the University of Leipzig (Volker Bigl), and by a representative from the Ministry of the Arts and Sciences in Saxony (Horst Bienioschek) the conference was opened by the first invited speaker, **Alice ter Meulen** (Groningen), who spoke on the topic "Three degrees of dynamic involvement: the case of temporal reasoning". In this talk ter Meulen presented her conception of dynamic aspect trees (DATs) designed to accommodate three types of updated information: the spreading of static descriptive information (informational update), the creation of new structures or chronoscopes (temporal update) as well as the movement of the point of update activity (perspectival update). As an example of a temporal update ter Meulen discussed the representation of the content of a past tense clause in a given linguistic context. If the clause refers to an event, as opposed to a state, a new temporal structure is created by introducing a new node dependent on the current open node under the condition that the new information is consistent with present information. If this consistency check turns out negative or if the current node is not an opened but a closed node, the construction rule must search for the lowest node dominating the current node which contains compatible information. It then allows attachment of the new node as a right sister. This procedure amounts to a revision of belief in which the architecture of a given DAT allows only a minimal change in the adjustment of the perspective on the information contained in the former chronoscope. The goal of the formalization of different possible algorithms for running DATs is to specify exactly how much informational update is computed in understanding language, as well as where and when such an informational update occurs.

After lunch the conference continued with the contributed talks distributed over three parallel sessions running Friday afternoon, all day Saturday and Sunday morning. The sessions were broken up with the talks of two further invited speakers and an additional lecture in honor of Gottlob Frege on the occassion of the 150 anniversary of his birthday this year. **Peter Gärdenfors** (Lund) proposed in his invited talk late Saturday afternoon on "Concept combination", a geometrical model of concept combination based on conceptual spaces. When two concepts X and Y — where each concept is represented as a set of regions in a number of domains — are combined, the regions for some domain of the modifier replaces the values of the corresponding region for the head constituent Y. If the regions of X are compatible with the regions of Y, the result can be described as the intersection of the concepts. If the regions are incompatible as in *pink elephant* for example, the region X ('pink') overrules that of Y (presumably 'grey'), revising Y. Hence, XY can no longer be described in terms of intersections. In *stone lion* the representation of 'stone' includes the property 'non-living' which is presumed by many of the domains of 'lion', which as a consequence can't be assigned any region at all, as the only domain of 'lion' that is compatible with 'stone is shape'. In a case like *red skin* Gärdenfors, using the idea that a contrast class determines a domain, maps the possible colors of the color spindle onto the space of skin colors. This mapping determines a subset or a smaller spindle in which the color words are used in the same way as in the full space. Thus, 'white' is used for the lightest forms of skin, 'black' for the darkest etc. Contrast classes may then modify the domains to which the modifying concept X is applied. Sunday noon **Manfred Krifka** (Austin) wound up the conference with his empirically oriented and carefully thought out invited talk on the structured account of questions and answers in which he pointed out a correspondence between theories of focus (à la Rooth) and theories of question meanings (i.e. as those developed by Jacobs and von Stechow). Krifka argued that the proposition set analysis of Hamblin, Karttunen and Groenendijk and Stokhof has difficulties in predicting the correct focus structure in answers in that it (a) cannot exclude over- or underfocussed answers, (b) is unable to distinguish between polarity and alternative questions and (c) doesn't allow for the proper formulation of one type of multiple questions. The problem often cited with the structured meaning framework of Hull, Hausser and Ginzburg, on the other hand, is that this approach can't provide an elegant way of accounting for embedded questions. Krifka proceeded to demonstrate how this putative problem can be solved in a non-ad-hoc manner by assuming lexical reules which disregard the specific semantic type 'question'. He illustrates this idea using the question-embedding verb *know*. The lexical rule for *know* expresses its exhaustive interpretation which may be too strong but the excess of information is needed independently of the problem at hand.

As an additional bonus the Leipzig professor **Lothar Kreiser**, who has for several decades dedicated his research to Gottlob Frege, closed Saturday's conference with an evening lecture entitled "Über den unbekannten Frege" in which he offered extremely interesting insights into less well-known aspects of the private life of the mathematican, philosopher and linguist Gottlob Frege, spelling out in particular details of his father's work and publications as a teacher of German and the influence these had in shaping Gottlob's ideas on the nature of language.

The three parallel sessions of the conference contained a total of 43 contributed talks on a broad spectrum of current topics in semantics. To convey an idea of the breadth of topics handled and the quality of argumentation displayed, one talk per session will be highlighted in more detail in the following. I apologize in advance, however, to the other speakers for not giving their ideas the recognition they deserve here due only to limitations of space and thank them explicitly for their participation in the conference. In the first session Friday afternoon **Ede Zimmermann** (Stuttgart) in "Disjunction and free choice" presented a solution to the problem of free choice permission defined by Hans Kamp in 1973. The problem can be more precisely formulated as the question of why sentences of the form 'X may A or B' are usually understood as implying 'X may A and X may B'. Unlike other approaches that locate the problem at the interface between semantics and pragmatics, Zimmermann offered a purely semantic account that depends crucially on a modal account of disjunction as a list of epistemic possibilities. After the coffee break, **Sebastian Löbner** (Düsseldorf) picked up on van der Auwera's puzzle from his 1993 paper "Beyond duality" that 'already' and 'finally' are incompatible in a sentence like *Peter is already/finally in Madrid*, with 'finally' expressing that the change into the positive state happened relatively late, whereas 'already' expresses that the change happened relatively early — excluding that it happend relatively late. This observation would invalidate the duality analysis proposed by Löbner in 1989. Löbner argues, on the other hand, that the relatively late change expressed by 'finally' is a different sense from that expressed by 'already': Finally has a nonpropositional meaning component consisting in the speaker's subjective negtive attitude toward the amount of time it took for p to come about. The propositional meaning is analyzed as expressing that a phase transition from not-p to p has occured (just like with 'already') but with the additional condition that the initial phase of not-p began long before the given time of reference. In contrast, 'already' has no corresponding expressive meaning component. Its sense of earliness derives naturally from its propositional meaning if a phase quantifier analysis is adopted. It then follows from the analysis that 'finally(p)' entails 'already(p)' since entailment is a matter of propositional meaning. The apparent conflict between the two particles is one of foregrounding. 'Already' foregrounds the second phase, 'finally' — due to its prominent expressive component — emphasizes the first. **Kerstin Schwabe** (Berlin) demonstrated that indefinite expressions in coordinative structures cf. *Hans hat Anna und Fritz hat Paula einen Schüler vorgestellt*, may differ with respect to their referential properties, and that this is due to their information structure which determines the syntactic representation of the construction as either elliptical or as a ATB structure. Following Rooth's 1992 theory of focus interpretation, she assumes that indefinites in shared focussed constituents must be beyond the actual coordination structure. A shared focussed constituent may therefore refer uniquely. In addition, the indefinite expression may also have a distributive reading. She then discussed empirical evidence supporting these claims. **Dorit Abusch and Mats Rooth** (Stuttgart) discussed empty-domain effects for presuppositional and non-presuppositional determiners. A sentence like *Every American prince was at the party* is viewed as odd relative to the knowledge that America has no nobility. However a sentence like *Two American princes were at the party* can be rejected (cf. *Certainly not, only women attended*) by evaluating it relative to a limited set of facts about the party ignoring the stable global fact which causes the presupposition to fail. The *every* sentence cannot be rejected in the same way because of the non-monotonicity in the truth value of *every*. **Annette Leßmöllmann** (Hamburg), in arguing for a conceptual theory of adjectival meaning and against theories of polysemy, explained the clash between the adjective and head noun in **der runde Weg/*the round way* by making reference to conceptual principles which constrain the applicability of shape terms to nouns denoting concrete objects. The adjective *rund* contains information relevant only to the contour of objects and not to the properties of the object's axis. Consequently, *rund* differs from adjectives like *gebogen* 'bent' and falls into the class of adjectives like *eckig* 'angular' which also cannot be applied to the shape of the maximal axis of an object (cf. *der eckige Deich* 'the angular dyke'). In the final session of the conference on Sunday morning, **Carla Umbach** (Berlin/Hildesheim) focussed on the meaning of *aber* 'but', the most neutral element used to contrast two propositions. Posing the question of what exactly is being contrasted when *aber* is used to connect two propositions, Umbach shows that *aber* interacts with the topic-focus structure of the conjuncts and proposes a focus-semantic analysis that allows for a general statement of the meaning of *aber* as well as maintaining its classical monotonicity: In the second conjunct, another alternative is introduced to the alternative set given by the focussed first conjunct. This newly introduced alternative is then implicitly or explicitly excluded as the topic of the first conjunct.

The conference concluded with a general meeting directed by the founding member of the Gesellschaft für Semantik, Arnim von Stechow (Tübingen), in which it was decided that the next conference will be held at the University of Düsseldorf.

SPEAKER–ORIENTED PARTICLES IN DUTCH IMPERATIVES

by *Marcel den Dikken*

1. The basic data

In a Dutch imperative like (1a), featuring the triadic verb *geven* 'give' in a prepositional dative construction, the dative prepositional phrase can be replaced with the locative R–word (Van Riemsdijk 1978) *hier* 'here', as seen in (1b). The semantics of the two examples in (1) is identical; the locative R–word is a perfect replacement of the dative PP.

(1)
a. geef dat boek eens *aan mij*!
give that book DPRT to me
b. geef dat boek eens *hier*!
give that book DPRT here

(1′)
a. geef dat boek eens *aan hem*!
give that book DPRT to him
b. *geef dat boek eens *hier*/*daar*!
give that book DPRT here/there (to him)

Such replacement of a dative PP with *hier* is possible only if the beneficiary argument is a first person — the *speaker* must be a/the beneficiary of the event, whence the name 'speaker-oriented' *hier*; (1b′) is ungrammatical, regardless of whether proximal *hier* or distal *daar* '(over) there' is used. Distal *daar* is not usable as a replacement of the first-person dative PP in (1b), for obvious reasons: the speaker him/herself is of course in the closest possible proximity to the speaker, which makes the use of *daar* infelicitous; but the use of both *hier* and *daar* fails in (1b′), irrespective of whether the *third*-person beneficiary is close to or farther removed from the speaker.

Replacing the dative PP *aan mij* (or plural *aan ons* 'to us') with *hier* is possible in finite imperatives of the type in (1b) and also in their counterparts in (2) featuring a null or right-peripheral direct object — constructions which Den Dikken (1992) analyses in terms of null operator movement: the object is a null operator moved leftward, optionally 'doubled' by a demonstrative DP in right-dislocated position. Infinitival imperatives also facilitate — in fact, prefer — this null operator object, as shown in Den Dikken (1992) (cf. *neerleggen die bal!* 'down-put-INF that ball'). But infinitival imperatives with dative PPs are not very good; here replacement of the dative with 'speaker-oriented' *hier* actually yields an improvement (cf. (2a′,b′)). Finite sentences with the illocutionary force of command imperatives behave like 'true' imperatives when it comes to *hier* replacement, as seen in (3a,b) and (4a,b). But polite commands, in the form of imperative-like *zou* 'would' questions, do not work with *hier*, as seen in the primed examples in (4).

(2)
a. geef *aan mij* (dat boek)!
give to me that book
b. geef *hier* (dat boek)!
give here that book

(2′)
a. ??*aan mij* geven (dat boek)!
to me give that book
b. ?*hier* geven (dat boek)!
here give that book

(3)
a. als je 't niet gauw *aan mij* geeft, dan...
if you it not quickly to me give then...
b. als je 't niet gauw *hier* geeft, dan...
if you it not quickly here give then...

(4)
a. wil je dat wel 'ns gauw *aan mij* geven!
want you that DPRT quickly to me give
b. wil je dat wel 'ns gauw *hier* geven!
want you that DPRT quickly here give

(4′)
a. zou je 't *aan mij* willen/kunnen geven?
would you it to me want /can give
b. zou je 't *hier* ??willen/*kunnen geven?
would you it here want / can give

In (2b), but not in (2b′) or (1b), *hier* can be replaced with the verbal particle *op* 'up':

(5)
a. geef *op* (dat boek)!
give up that book
b. *geef dat boek *op*! (cf. (1b))
**op* geven (dat boek)! (cf. (2b′))

This *op* is like the *hier* used in the previous examples in being 'speaker-oriented', and being understood as a 'replacement' of a first-person dative PP. Thus, (5a) is interpretively equivalent to (2a,b). Though serving the same purpose, *op* differs in its distribution from *hier* — it is more restrictive in occurring only in *finite 'true' imperatives* whose object is a *null operator*; but it is more liberal in that it can 'replace' the dative PP in constructions with verbs of communication, as shown in (6)–(8), where *op* shows precisely the same distribution as in (5), but where *hier* is impossible throughout. While 'speaker-oriented' *hier* seems confined in its distribution to cases of physical transferral of an object, *op* is not so constrained.

(6)
a. zeg *op*/**hier* (wat je te zeggen hebt)!
say up/ here what you to say have
b. *zeg wat je te zeggen hebt *op*!
**op* zeggen (wat je te zeggen hebt)!

(7)
a. vertel *op*/**hier* (wat je te vertellen hebt)!
tell up/ here what you to tell have
b. *vertel wat je te vertellen hebt *op*!
**op* vertellen (wat je te vertellen hebt)!

(8)
a. vraag ?*op*/**hier* (wat je te vragen hebt)!
ask up/ here what you to ask have
b. *vraag wat je te vragen hebt *op*!
**op* vragen (wat je te vragen hebt)!

All of the examples of 'speaker-oriented' *hier*/*op* given in the above involve *triadic* verbs — more specifically, verbs which take a dative *aan*–PP complement. They contrast systematically with imperatives such as (9b) or (10b,d).

(9)
a. stuur ??*aan*/*naar mij* (dat boek)!
send to_{dat}/to_{dir} me that book
b. *stuur *hier* /*op* (dat boek)!
send here /$up_{speaker\text{-}oriented}$ that book

(10)
a. roep/bel /E-mail *aan/ *naar* mij!
call /phone/E-mail to_{dat}/to_{dir} me
b. *roep/bel /E-mail *op*!
call/ phone/E-mail up
c. schreeuw/fluister *aan /tegen mij!
shout /whisper to_{dat}/$towards_{dir}$ me
d. *schreeuw/fluister *op*!
shout /whisper up

Especially interesting are the cases of *sturen* 'send' in (9b) and *bellen* 'phone' in (10b). These verbs can combine with the particle *op* to form the particle-verbs *opsturen* 'send out' and *opbellen* 'phone/call up'; but *op* can*not* be used in combination with *sturen* and *bellen* in its guise as a 'speaker-oriented' particle: (9b) and (10b) with *bellen* are deviant on the 'speaker-oriented' reading of *op* (though they are perfect, of course, with *op* qua lexical particle). The cause of the deviance of all these examples lies in the fact that the verbs used in them do not take a dative PP but an (optional) directional *naar* or *tegen*–PP instead — combinability with a dative *aan*–PP is an important constraint on the construal of transitive verbs with 'speaker-oriented' particles.

It turns out not to be a sufficient condition, though. For the lexical particle verb *opsturen* 'send out' differs from plain *sturen* precisely in taking a dative *aan*–PP complement rather than a *naar*–PP, but nonetheless it — like other particle verbs — resists construal with 'speaker-oriented' *hier*/*op*:

(11)
a. stuur *aan* /*naar mij* **op** (dat boek)!
send to_{dat}/to_{dir} me up that book
b. *stuur *hier*/*op* **op** (dat boek)!
send here/$up_{speaker\text{-}oriented}$ up that book

(12)
a. geef *aan mij* **door** (dat boek)!
give to me through that book
'pass that book on to me!'
b. *geef *hier* /*op* **door** (dat boek)!
give here/$up_{speaker\text{-}oriented}$ through that book

Nor is combinability with a dative PP a necessary restriction on verbs used with 'speaker-oriented' particles. As it stands, the constraint formulated at the end of the previous paragraph is accurate — all *transitive* verbs used with *op* and *hier* must be triadic. But 'speaker-oriented' *op* and *hier* can also be used in precisely one non-dative context — with the verb *komen* 'come', as seen in (13).

(13)
a. kom *hier*!
come here
b. kom *op*!
come up (cf. English *come on!*)

(14)
a. *hier* komen!
here come-INF
b. **op* komen!
up come-INF
c. als je niet gauw *hier* komt, dan...
if you not quickly here come then...
d. *als je niet gauw *op* komt, dan...
if you not quickly up come then...
e. wil je wel 'ns gauw *hier* komen!
want you DPRT quickly here come
f. * wil je wel 'ns gauw *op* komen!
want you DPRT quickly up come

As before, *hier* and *op* are 'speaker-oriented': the examples in (13) are paraphrases of *kom bij mij*/*ons!* 'come to me/us!', featuring a first-person locative PP. And once again, we find a difference in distribution between *hier* and *op*, with *op* usable only in finite 'true' imperatives. And though, unlike in the triadic cases, *hier* can be combined with *komen* in non-imperative constructions as well (*hij komt hier vaak* 'he comes here often'), the function of *hier* seems different in these cases — while in non-imperative sentences *hier* alternates with distal *daar* (*hij komt daar vaak*) and hence is not 'speaker-oriented', it is impossible to replace *hier* with *daar* in (13) and (14). In this respect, it is parallel to the *hier* in (1b,b′).

A further parallel between the triadic examples featuring 'speaker-oriented' *hier* and *op* and the *komen* cases in (13) and (14) is the complementary distribution of 'speaker-oriented' particles and 'real' particles.

(15)
a. kom maar *bij me*/*ons* **binnen**!
come DPRT to me/us inside
b. *kom maar *hier*/*op* **binnen**!
come DPRT here/up inside

Systematically, we find that particle verbs resist 'replacement' of a first-person PP with 'speaker-oriented' *hier* or *op*. Let us take this as our vantage point in the search for an analysis of these particles.

2. Analysis

The incompatibility of *op* qua dative replacer with verbal particles is not particularly surprising

in view of the fact that it is impossible in general to combine two verbal particles in a simple sentence — attempts at combining *op* and *door* such as (16a,b) all fail miserably, while (16c,d) are fine.

(16)
a. *ik heb de controle *op* **door** gevoerd
I have the checks up through taken
b. *ik heb de controle **door** *op* gevoerd
I have the checks through up taken
c. ik heb de controle *op* gevoerd
I have the checks up taken
'I have intensified the checks'
d. ik heb de controle **door** gevoerd
I have the checks through taken
'I have undertaken the checks'

We can understand the deviance of the examples in (16a,b) on the assumption (argued for in detail in Den Dikken 1995, taking the lead of work by Richard Kayne and Teun Hoekstra) that particles are heads of small clauses in the complement of a verb. As a consequence, there will be at most one verbal particle per simple clause. This account of (16a,b) extends to (12b) with *op* once we realise that what we are dealing with in (5a), as a 'replacement' of the dative PP, is the same element *op* also found in verb–particle constructions — i.e., a verbal particle, heading a small clause in the complement of the verb. And it extends even further, to the examples with *hier* 'replacing' the dative PP, on the assumption that *hier* 'here' can be used as a particle, much like *op*. The fact that German uses the particle *her* rather than the locative *hier* as its 'replacement' of a first-person dative PP in imperatives (*gib das Buch mal her!*) squares well with this particle approach to Dutch 'speaker-oriented' *hier*.

All this opens up a perspective on the 'replacement' of dative PPs with things like verbal particles which will make the phenomenon less exotic than it looks on the literal replacement approach. In Den Dikken (1995) I analyse triadic constructions in terms of a complex small clause structure in which the verb takes a small clause (SC; categorial labels are immaterial in this discussion) headed by a (possibly null) particle as its complement, this particle in its turn selecting a small clause headed by the dative preposition:

(17)
$[_{VP}\ V\ [_{SC1}\ Spec(\theta')\ [_{PrtP}\ Prt\ [_{SC2}\ DP\ [_{PP}\ P\ DP]]]]]$

What we can now envisage as the function of 'speaker-oriented' *op* and *hier* is that they spell out the head position of SC1 and license a form of *pro*-drop of the dative PP — the overt presence of *hier*/*op* in (17) licenses, perhaps as a result of their possessing a first-person feature, a null counterpart of first-person dative PPs. And on the economy based assumption that, whenever a null form is licensed, it *has to* be used instead of the overt form, *hier*/*op* will then prevent a dative PP from appearing (cf. (18)). The impression that *hier*/*op* replace the dative PP is merely an illusion on this view; what *hier*/*op* do is sanction (and hence force) the absence of the dative PP.

(18)
*geef <*aan mij*> *hier*/*op* <*aan mij*> dat boek!
give to me here/up to me that book

(19)
*kom <*bij mij*> *hier*/*op* <*bij mij*>!
come to me here/up to me

On a par with (18), attempts at combining 'speaker-oriented' *hier* and *op* with a first-person PP (this time headed by *bij*; cf. (15a)) in imperatives with *komen* crash irremediably (cf. (19)). This prompts an extension of the account to *komen* constructions. The ungrammaticality of (19) follows on the assumption that the 'speaker-oriented' particles used here occupy the 'Prt' slot in a structure as in (17) and by way of a lexical property license (hence force) the covertness of the PP in their complement (cf. Broekhuis & Cornips 1997 for cogent arguments to the effect that *bij*–PPs, like *aan*–PPs, are deeply embedded SC predicates).

A consequence of this assumption is that *komen* is like *geven* in systematically taking a particle-headed SC complement. This is independently plausible (cf. also Moro 1997:229ff.). *Komen* is like the particle verbs *aankomen* 'arrive' and *binnenkomen* 'enter' in denoting a temporally delimited event but it differs from the latter two in not explicitly realising the end-point of the event. On the assumption that 'plain' *komen* takes an abstract particle as its complement, its parallels with the particle verb (also with respect to *zijn* 'be' selection in the perfect) are straightforward.

3. Further consequences and questions

In (5)–(8) I observed that transitive imperatives with 'speaker-oriented' *op* have a strong predilection for right-peripheral objects. This cannot be a matter of heaviness: the object in (5) is obviously not heavy. So the ungrammaticality of the b–examples in (5)–(8) seems due instead to a predilection on the part of these imperatives for a *null-operator* object. This is confirmed by the fact that (esp. Flemish) speakers who do not accept right-peripheral object placement in imperatives also turn out to lack 'speaker-oriented' *op* (and to reject (2b) and (2b′) with *hier* as well, of course).

Op's predilection for null-operator imperatives also seems responsible for the fact that clausal objects of verbs like *zeggen* show up as *root* clauses ('direct speech') rather than as embedded clauses whenever 'speaker-oriented' *op* is used. The examples in (20) illustrate this: the b–example, which features an indirect/reported speech clause, is bad with *op* (but perfect with *op* left out or replaced with a dative).

(20)
a. zeg {*op*/*me*}: waar heb je gezeten?
say up/me$_{dat}$: where have you been
b. zeg {?*op*/*me*} waar je hebt gezeten!
say up/me$_{dat}$ where you have been

In indicative clauses, direct speech complements can occur in either the *Mittelfeld* (as in *Jan zei 'waar heb je gezeten?' tegen Piet* 'Jan said "where have you been?" to Piet') or the *Nachfeld* (*Jan zei tegen Piet: 'waar heb je gezeten?'*); and they alternate with indirect speech clauses, which show up at the right edge in Dutch. In 'speaker-oriented' *op* imperatives, only right-peripheral placement is possible, yet indirect speech complements are excluded. We can make sense of this paradox by assuming that direct speech clauses are construed with an *empty-headed object noun phrase*. In simple indicatives, this object–NP is found in its normal *Mittelfeld* position; the direct speech clause either forms a constituent with it or it is in 'extraposed' position — a possibility common to all clauses construed with object–NPs. In imperatives with 'speaker-oriented' *op*, the object is a null operator, and the NP with which the direct speech clause is construed is a right-dislocate. The direct speech clause hence has no choice but to surface in right-peripheral position. The ungrammaticality of *indirect* speech clauses in imperatives with *op* (20b) then follows on the further assumption that such CPs can be construed neither with an NP nor with a null operator — reported speech clauses are *never* noun-dependents or right-dislocates: they are *always* complements of verbs.

These are some interesting results. But clearly, the discussion of 'speaker-oriented' particle constructions (which, to my knowledge, have not figured in the literature of either imperatives or dative constructions so far) has only scratched the surface of what will no doubt prove to be an iceberg of questions — Why only in (a subset of) imperatives? Why only 'speaker-oriented' particles (cf. *geef* {*hier*/*daar*})? Why only in (northern) Dutch? Why doesn't (standard) English, which has 'speaker-oriented' *here* and *on* in *come here*/*on!*, generalise their use to *give* constructions (while non-standard English apparently does use *here* there, as Richard Kayne and Janet Fodor tell me)? Why *op* rather than some other particle?

Let us briefly consider this last question in closing. From the point of view of the pragmatics of imperatives, the choice of *op* makes perfect sense. The type of imperative sentence in which *op* can figure is the direct, 'unpolished' imperative, used as a command. Social contexts in which commands are used are characterised by a hierarchical relationship between the speaker (the commander) and the hearer. The use of *op* 'up' rather than its antonyms *neer* 'down' or *af* 'off, down' matches this hierarchical relationship — the speaker positions him/herself in space in a position *above* the hearer, as a result of which the hearer will have to give, speak, ask or come 'in an upward direction', towards the speaker. The nature of the speech act, then, naturally leads to the selection of the particle *op* rather than any other verbal particle.

Particles marking social hierarchical relationships between interlocutors are familiar from other language families — and in effect, in Japanese the honorific marker used in command contexts of the type discussed in the foregoing is an element meaning 'up' (Miki Suzuki, p.c.). We do not customarily think of Dutch as a language featuring 'honorific' elements, but our discussion of 'speaker-oriented' *op* suggests that in fact Dutch has these elements, too.

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