Deep Unaccusativity in LFG

Joan Bresnan and Annie Zaenen
Stanford University and Xerox-PARC

1 Deep versus Surface Unaccusativity

Rappaport and Levin (1989) propose a basic distinction between two types of unaccusativity, 'deep' and 'surface' unaccusativity. In languages with surface unaccusativity, the argument of an intransitive verb can appear overtly in object position(s) in surface constituent structure. In languages with deep unaccusativity only, that argument appears only in surface subject position(s).

Italian as described in e.g. Rosen (1981, 1988) and Burzio (1981, 1986) and Chichewâ as described in Bresnan and Kanerva (1989, in press) are surface unaccusativity languages. To illustrate the type of analysis for Italian: in an example such as (1), the argument *molti* 'many' appears overtly in the postverbal object position of the unaccusative verb *arrivare* 'arrive', and allows *ne*-cliticization of its partitive complement just as direct objects do. So one can analyze it as a surface object.

(1) *Ne arrivano molti.*
of-them arrived many.
'Many of them arrived.'

Surface unaccusativity has been analyzed in a variety of syntactic frameworks including Relational Grammar (e.g. Rosen, 1981, 1988, Perlmutter, 1983), Government Binding (e.g. Burzio, 1981, 1986, Rappaport and Levin, 1989) and Lexical Functional Grammar (e.g. Baker, 1983, Levin, 1986, Bresnan and Kanerva, 1989). It presents no problems for any of them given that they all have the means to make the distinction between different surface grammatical functions.[1]

English as discussed in Simpson (1983) and Rappaport and Levin (1989), and Dutch as discussed in Perlmutter (1978), Levin (1986), and Zaenen (to appear) are examples of languages with deep unaccusativity.[2] In English,

[1]This account oversimplifies certain theoretical differences. For example, Rosen (1981, 1988) actually analyzes the argument in sentence (1) as an underlying object and a surface chômeur for reasons having to do with constraints on dummies in RG. Similarly, Burzio (1981, 1986) analyzes the unaccusative object as adjoined to the VP in the same syntactic configuration as postposed unergative subjects, but forming a chain with a null expletive subject. However, Belletti (1988) argues that the unaccusative NPs do appear in object position, as had been argued previously by Baker (1983).

[2]To be more precise, we should classify phenomena and not languages as exhibiting deep or surface unaccusativity. English as described in Bresnan (1990a) has surface unaccusativity in one construction, and den Besten (1985) argues that some constructions in Dutch are instances of surface unaccusativity.

for example, there is no difference in the surface syntactic positions of the unaccusative and unergative verbs:

(2) The river froze. (unaccusative)

(3) The dog barked. (unergative)

Nevertheless it can be argued that in example (2) we have an unaccusative verb, whereas in (3) we have an unergative one. An important argument for the syntactic relevance of the distinction in English is the pattern exhibited by resultative predication, as first observed in Simpson (1983). A resultative predicate[3] can be applied to the object of a transitive verb as in (4a), to the subject of a passive as in (4b), and to the subject of an unaccusative verb as in (5).

(4) a. We pounded the metal flat. (transitive)

b. The metal was pounded flat. (passive)

(5) The river froze solid. (unaccusative)

(6) *The dog barked hoarse. (unergative)

But a resultative cannot be applied to subjects in general. For example resultative predication cannot be applied to the subject of a transitive verb or that of an unergative verb: (4a) cannot mean that we got flat by pounding the metal and (6) cannot mean that the dog was hoarse as a result of barking.

As the examples show, one cannot appeal to surface grammatical functions to state what the arguments have in common that resultatives can be predicated of. According to Rappaport and Levin, a necessary condition on the arguments of resultative predication is that they be governed by the verb in D-structure—that is, that they be deep objects or deep subjects of small clauses which receive exceptional case marking from the verb.[4]

[3]Resultatives have to be distinguished from depictives: a resultative, as the term indicates, describes a state resulting from the main action, whereas a depictive describes a state holding while the action is taking place. In the following example, we have a depictive that can be predicated of either the subject or the object of the sentence:

(i) I met her in the hallway, drunk as usual.

For more discussion see Halliday (1967).

[4]This is not a sufficient condition. There are other semantic conditions on resultatives, the most simple one being that the main predicate has to describe an action with a possible result, a change of state, as illustrated by the fact that (i) has only a depictive reading.

(i) We saw the rose blooming.

The resultative is predicated of the argument that undergoes the change of state. We will not discuss these factors here in any detail. For some observations see Van Valin (1989), Tenny (1987).

Hence theories like LFG—and monostratal theories in general—cannot capture the generalizations governing resultative predication because they lack deep grammatical functions. In the remainder of this paper we show that this is an unwarranted conclusion and that the syntactic generalizations underlying unaccusativity can be captured by other means than underlying grammatical functions.

One way to show that deep grammatical functions are not necessary would be to express the generalizations underlying (4)–(6) in purely semantic terms: the resultative is predicated of the argument undergoing the change of state designated by the verb. We will call this the theme argument. This direction is taken in Van Valin (1989). However, Rappaport and Levin argue that such an approach cannot succeed in principle: resultative predication applies not only to deep objects which are semantic arguments of their verbs, but also to so-called nonthematic arguments, which do not stand in a direct semantic relation to the main verb. This is the case with 'fake reflexives' (Simpson 1983) illustrated in (7) and with 'nonsubcategorized objects' illustrated in (8):

(7) a. The dog barked itself hoarse. (fake reflexives)

b. We ran ourselves ragged.

(8) a. The dog barked us awake. (nonsubcategorized objects)

b. We ran the soles right off our shoes.

According to Rappaport and Levin, the postverbal NPs in these examples bear no thematic relation to the verbs *bark* or *run*. Carrier and Randall (1988) argue that this explains their failure to allow middle formation as illustrated (9):

(9) a. *We bark awake easily. (middles)

b. *The soles ran right off our shoes.

But if these arguments are nonthematic, resultative predication cannot be formulated in terms of a generalization stated on semantic roles. Some nonsurface levels of syntactic structure seem to be required.

In the GB framework which Rappaport and Levin assume, these nonthematic arguments form a small clause with the resultative predicate. Accordingly, they are exceptionally case-marked by the unergative verb but are not assigned a θ-role by it. From this analysis and the assumption first proposed in Burzio (1981) that unaccusative verbs cannot assign case, they derive the result that unaccusative verbs cannot take either fake reflexives or nonsubcategorized objects. This is illustrated in (10) and (11):

(10) *She flushed herself red. (unaccusatives)

(11) *The dog fell us awake.

The challenge then posed by the Rappaport and Levin analysis is this: how, in a theory that lacks deep grammatical functions, can one account for the distribution of resultatives, including their appearance with fake reflexives and nonsubcategorized arguments and the nonappearance of the latter with unaccusative verbs?

2 Syntactic Underspecification in LFG

In fact the Lexical Mapping Theory of LFG as developed in Levin (1986), Bresnan and Kanerva (1989), Alsina and Mchombo (1989), Zaenen (to appear), Bresnan and Moshi (1990), and Alsina (1990) provides a simple solution to this problem. To show this, we outline the relevant assumptions.

2.1 The Theory of A-structures

In our approach, the grammatically significant participant-role relations in the structure of events are represented by a-structures. An a-structure consists of a predicator with its argument roles, an ordering that represents the relative prominence of the roles, and a syntactic classification of each role indicated by a feature. Examples are given in (12) and (13):[5]

(12) $$\begin{array}{cccc} \textit{pound} & < & \textit{ag} & \textit{pt} & > \\ & & [-o] & [-r] & \end{array}$$

(13) $$\begin{array}{ccc} \textit{freeze} & < & \textit{th} & > \\ & & [-r] & \end{array}$$

The relative prominence of the roles is indicated by their left to right order and reflects a thematic hierarchy. The ordering is the one proposed in Kiparsky (1987), Bresnan and Kanerva (1989), and elsewhere, and might be derived from semantic primitives along the lines of Dowty (1987): *agent* < *beneficiary* < *experiencer/goal* < *instrument* < *patient/theme* < *locative*. Thus the most prominent role of *pound* is the agent, the most prominent role of *freeze* is the theme. The notation $\hat{\theta}$ designates the most prominent role of a predicator.

Although the agent of (12) and the theme of (13) are the most prominent roles in the respective argument structures, there are important syntactic differences between them. These are captured by the syntactic features of the a-structure. The a-structure features $[\pm o]$ and $[\pm r]$ constrain the way in which the roles are mapped onto syntactic functions in f-structures. The syntactic functions are grouped into natural classes as shown in (14):

[5] The thematic labels *ag(ent), th(eme)* are used here as abbreviations for a finer-grained semantic analysis. Cf. Dowty (1987) and Pinker (1989).

(14)

$$
\begin{array}{ccc}
-r & \text{S} & -o \\
\\
\text{O} & & \text{OBL}_\theta \\
\\
+o & \text{O}_\theta & +r
\end{array}
$$

The feature $[-r]$ refers to an *unrestricted* syntactic function, the kind of function which is not restricted as to its semantic role. Only subjects and objects are $[-r]$; obliques and restricted objects are $[+r]$. The feature $[-o]$ refers to a *nonobjective* syntactic function, the kind of function which complements intransitive predicators such as N or A. Only subjects and obliques are $[-o]$; objects and restricted objects are $[+o]$. Not all languages make use of all these possibilities. Many languages lack restricted objects; this is one difference between Romance and Germanic, for example. However, we assume that all languages have subjects.[6] In our representation, the minus features define the less marked syntactic functions; the subject is least marked, and the restricted object is most marked. Thus (14) can be read as a markedness hierarchy of syntactic functions, descending from top to bottom.

It follows from this classification that a $[-o]$ role cannot be mapped onto an object, and a $[-r]$ role can be mapped onto a subject or object:

(15)

$$
\begin{array}{lcc}
\text{a-structure:} & \theta & \theta \\
 & [-o] & [-r] \\
 & \not\mid & \mid \\
\text{f-structure:} & \text{O} & \text{S/O}
\end{array}
$$

The basic principles for determining the unmarked choice of syntactic features in the a-structure (ignoring cases of lexical idiosyncrasy) are simple and general across languages:

(16) patientlike roles: $\begin{array}{c}\theta \\ [-r]\end{array}$

secondary patientlike roles:[7] $\begin{array}{c}\theta \\ [+o]\end{array}$

other roles: $\begin{array}{c}\theta \\ [-o]\end{array}$

The a-structure allows us to define notions akin the those of external and internal argument as used e.g. in Levin and Rappaport (1986): an internal

[6] This assumption is not uncontroversial. See Foley and Van Valin (1984) and Andrews (1985) for discussion.

[7] Verbs may have multiple patientlike roles, as with ditransitives. Which roles count as secondary appears to be a parameter of variation. See Alsina and Mchombo (1989), Bresnan and Moshi (1990), Huang (1990), and Alsina (1990) for further discussion.

argument has one of the object features ($[-r]$ or $[+o]$), and the external argument is a $\hat{\theta}$ which is $[-o]$. Note that a-structures may have empty argument roles that have no semantic role content; these can only be $[-r]$, by definition of the unrestricted feature.

Conditions can be imposed on the a-structure. In some languages more than one semantic role can be associated with $[-r]$ whereas in others this association is limited to just one. Bresnan and Moshi (1990) argue that the classical typological differences between symmetrical (so-called 'double object') languages and asymmetrical ones follows from this parameter and illustrate this with a comparison of Chicheŵa and Kichaga. English is another language in which this constraint on a-structures, stated in (17), holds (Alsina and Mchombo (1989), Bresnan (1990b)):

(17)
$$* \quad \begin{array}{cc} \theta & \theta \\ | & | \\ [-r] & [-r] \end{array}$$

When, in an asymmetrical language, there are two patientlike roles (such as a recipient object and a theme, for example), $[+o]$ will be assigned to the secondary one. In English this is always the lower role on the hierarchy.

The lexical stock of a-structures in a language can be extended by morphological means.[8] For example, the a-structure of a passive verb differs from the active in that the most prominent role cannot be mapped onto a syntactic argument in the f-structure (though it may be linked to an argument adjunct such as the by-phrase in English). This is called 'suppression'. The notation is given in (18):

(18) Passive:
$$\begin{array}{c} \hat{\theta} \\ | \\ \emptyset \end{array}$$

In sum, the a-structures of words contain the minimal lexical information needed for the projection of semantic roles onto surface syntactic functions. A fundamental generalization embodied in them is that patientlike roles may alternate between subject and object while other roles such as agent and e.g. locatives alternate between the nonobject functions. This captures a pervasive typological pattern across languages. (See Bresnan and Kanerva, 1989, pp. 25–26.)

[8]—and possibly also by syntactic means such as phrasal composition of a-structures in certain cases of complex predicates. Syntactic relation changes were precluded in early versions of LFG because relation changes involved nonmonotonic attribute changes (e.g. OBJ → SUBJ). The present theory is monotonic and compatible with the syntactic composition of complex predicates under certain conditions, as proposed for instance in Grimshaw and Mester (1988), Sells (1989), Matsumoto (1990), Yatabe (1990), Mohanan (1990), and Bature (1990).

2.2 Principles Mapping A-structures to Syntactic Functions

The basic syntactic principles for mapping a-structures to surface grammatical functions are simple.[9] The underspecified roles are freely mapped onto all compatible grammatical functions subject to a few general constraints: if available, the 'external' argument (as defined above) has to be mapped onto the subject; if there is no external argument, an internal argument is mapped onto the subject. All other roles are mapped onto the lowest compatible function on the markedness hierarchy (14).

(19) **Mapping Principles:**

a. Subject roles:

(i) $\underset{[-o]}{\hat{\theta}}$ is mapped onto SUBJ; otherwise:

(ii) $\underset{[-r]}{\theta}$ is mapped onto SUBJ.

b. Other roles are mapped onto the lowest compatible function on the markedness hierarchy (14).

There are other constraints on the mapping, such as Function-argument Biuniqueness:[10]

(20) *Function-argument biuniqueness:* Each a-structure role must be associated with a unique function, and conversely.

Multiple restricted objects and obliques are possible because these functions are further individuated by their semantic roles (see Bresnan and Kanerva, 1989, p. 25 for discussion).

2.3 Examples

The active form of *pound* has an agent role and a patient role. These are respectively assigned a $[-o]$ and a $[-r]$ feature by the a-structure principles given above. The $[-o]$ argument is also the most prominent argument, given the thematic hierarchy, so it is the 'external argument'. The a-structure is as given in (21):

(21) $\textit{pound} < \underset{[-o]}{\textit{ag}} \quad \underset{[-r]}{\textit{pt}} >$

[9] For a formally equivalent system, see Alsina (1990).

[10] For cases not discussed in this paper, we also need the Subject Condition, according to which every (verbal) predicator must have a subject. This condition may need to be parameterized so as to hold only for some types of languages (see Bresnan and Kanerva, 1989; Mohanan, 1990).

According to the a- to f-structure mapping principles in (19), the 'external' argument role will be mapped onto the subject (19a(i)); the other argument role will be mapped to the unrestricted object function, the most marked function compatible with the $[-r]$ a-structure feature:

(22) TRANSITIVE:

$$\begin{array}{llcccll} \text{a-structure:} & \textit{pound} & < & ag & pt & > & \\ & & & [-o] & [-r] & & \\ & & & | & | & & \\ \text{f-structure:} & & & \mathrm{S} & \mathrm{O} & & \text{((19a(i)) and (20))} \end{array}$$

In the passive a-structure, $\hat{\theta}$ is suppressed and an internal role is mapped onto the subject function by (19a(ii)):

(23) PASSIVE:

$$\begin{array}{llcccll} \text{a-structure:} & \textit{pounded} & < & ag & pt & > & \\ & & & [-o] & [-r] & & \\ & & & \emptyset & | & & \\ \text{f-structure:} & & & & \mathrm{S} & & \text{((19a(ii)))} \end{array}$$

The unaccusative is subject to the same mapping as the passive: here there is no external argument, so again (19a(ii)) applies to constrain the subject mapping.

(24) UNACCUSATIVE:

$$\begin{array}{llccll} \text{a-structure:} & \textit{freeze} & < & th & > & \\ & & & [-r] & & \\ & & & | & & \\ \text{f-structure:} & & & \mathrm{S} & & \text{((19a(ii)))} \end{array}$$

In the unergative, the sole argument is also mapped onto the subject function, but this time by virtue of principle (19a(i)) :

(25) UNERGATIVE:

$$\begin{array}{llccll} \text{a-structure:} & \textit{bark} & < & ag & > & \\ & & & [-o] & & \\ & & & | & & \\ \text{f-structure:} & & & \mathrm{S} & & \text{((19a(i)))} \end{array}$$

3 Resultatives and A-structure

Returning to the resultative generalizations discussed by Rappaport and Levin, we can now see that the resultative predicate only applies to an argument that is classified as $[-r]$ in the a-structure. We repeat the relevant examples here:

(26) a. We pounded the metal flat. (transitive)

b. The metal was pounded flat. (passive)

(27) The river froze solid. (unaccusative)

(28) *The dog barked hoarse. (unergative)

Only in (28) is the resultative predicated of an argument which lacks a $[-r]$ specification in the a-structure. Why does resultative predication have access to this information? Because, as argued in Simpson (1983), it alters the a-structure by adding the resultative argument to the predicate.

Other syntactic properties of resultatives now follow. First, because oblique functions are by definition restricted, and hence cannot be $[-r]$ in the a-structure, resultatives can never be predicated of them, as illustrated in (29):

(29) a. *I pounded on the metal flat.

b. *Load hay into the wagon full.

c. *The soldiers shot at the man dead.

Second, because in English there can only be one $[-r]$ argument in the a-structure, and because nonsemantic roles by definition can only be $[-r]$, unaccusative verbs cannot have nonthematic objects. This explains the contrast between the ability of unergatives and unaccusatives to take fake reflexives and nonsubcategorized objects, as illustrated in (30) and (31):

(30) a. She shouted herself beet red.

b. The dog barked him awake.

(31) a. *She flushed herself beet red.

b. *The dog fell him awake.

Third, in the double object construction resultative predication is not possible on either argument, as (32a) shows:

(32) a. *John cooked Mary the egg hard.

b. John cooked the egg hard for Mary.

We assume that in neither (32a) nor (32b) is *Mary* a possible target for resultative predication, because of its semantic role. However, *the egg* is semantically a possible target as shown by (32b). It is not available in the (32a) because the theme argument will be marked $[+o]$ in the a-structure as discussed in section 2.1.

4 Conclusion

The theory we have outlined provides a simple explanation for the generalizations observed in Rappaport and Levin, but it does so without appealing to deep grammatical functions. Instead, we use a level of argument structure, which consists of predicators, their hierarchically ordered argument roles, and the skeleton of syntactic information common to all possible projections onto f-structures. These argument structures play a role in our theory that is analogous to that of D-structure (or initial stratum) in other syntactic theories. Like D-structures they impose syntactically relevant prominence relations on underlying lexical semantic structures, and like D-structures, they allow us to distinguish between 'internal' and 'external' arguments. But unlike the theory of D-structures, the theory of a-structures is compatible with the constraint-based architecture of LFG.

The theory we have outlined, coupled to a theory about the mapping between grammatical functions and phrase structure categories, also derives the salient structural differences between 'external' and 'internal' arguments found in languages that rely mainly on configurational encoding such as English. The $\overline{\mathrm{X}}$ theory of Bresnan (1982) follows Jackendoff (1978) in defining categories in terms of functions. By definition, the VP is the phrase structure category that is both predicative (i.e. cannot dominate a subject NP) and potentially transitive (i.e. can dominate object NPs). It follows that in a language that has a VP, the $\underset{[-o]}{\hat{\theta}}$ argument, being realized as a SUBJ, must appear outside of the VP, while the $[-r]$ argument(s), being realized as either SUBJ or OBJ can appear either inside or outside the VP. These alternative realizations of $[-r]$ arguments inside and outside the VP have led some researchers to postulate that these arguments are moved, but as our discussion above shows, movement is only one way to account for the alternation. Our account has the advantage of generalizing gracefully to languages in which VP constituents are not independently motivated.

But the comparison between the two accounts of deep unaccusativity discussed here brings out a more general difference between two types of linguistic models: multistratal accounts like the one advocated by Rappaport and Levin, and more generally RG and GB accounts of similar phenomena, tend to assume without discussion that the kind of entitites that one finds in the surface representation are of the same nature as those that are found at more abstract levels of representation, and that each stratum has to be a full specification of a sentence. Under the approach that we have taken, the underspecification approach, this assumption is not made: the fact that a particular element has some properties in common with, say, a surface object, is not taken as evidence that it has to be an object at some level of representation. The common property might be one that does not exhaustively characterize any surface entity, e.g. in the case under discussion, the property captured by the feature $[-r]$. The difference between our model and that proposed in GB and RG is akin to the difference between the phonological model in *The Sound Pattern of English* and more recent phonological approaches in autosegmental and metrical phonology. Our theory is monostratal in the sense of Ladusaw (1985), in that it does not assume that there are for each sentence different strata with the same primitives and the same geometry.

It is not the place here to discuss the respective merits of these two types of theories, but inasmuch as we have shown that monostratal theories can account for the kind of data that practitioners of RG and GB think of as establishing the need for a multistratal architecture, our analysis should make them question this basic assumption.[11]

References

Alsina, A. (1990) "Where's the Mirror Principle? Evidence from Chichewâ," paper presented at the 13th GLOW Colloquium at St. John's College, Cambridge University, April 6–8, 1990.

Alsina, A. and S. A. Mchombo (1989) "Object Asymmetries in the Chichewâ Applicative Construction," to appear in S. Mchombo, ed., *Theoretical Aspects of Bantu Grammar,* CSLI, Stanford University.

Andrews, A. (1985) "The Major functions of the Noun Phrase," T. Shopen, ed., *Language Typology and Syntactic Description. Volume I: Clause Structure,* Cambridge University Press, Cambridge, England, pp. 62–154.

Baker, M. (1983) "Objects, Themes and Lexical Rules in Italian," in L. Levin, M. Rappaport and A. Zaenen, eds.

Bature, A. (1990) "Cliticization and Argument Structure in Hausa," paper presented at the 21st Annual Conference on African Linguistics, University of Georgia, Athens, April 12–14, 1990.

Belletti, A. (1988) "The Case of Unaccusatives," *Linguistic Inquiry* 19, 1–34.

den Besten, H. (1985) "The Ergative Hypothesis and Free Word Order in Dutch and German," in J. Tomán, ed., *Studies in German Grammar*, pp. 23–64, Foris, Dordrecht, The Netherlands.

Bresnan, J. (1982) "Control and Complementation," in J. Bresnan, ed., *The Mental Representation of Grammatical Relations,* The MIT press, Cambridge, Mass.

Bresnan, J. (1990a) "Levels of Representation in Locative Inversion," duplicated, Department of Linguistics, Stanford University, Stanford, California.

[11] We thank Beth Levin and Malka Rappaport for discussion of the issues in this study.

Bresnan, J. (1990b) "Relation Changes, Monotonicity, and Universality in Syntax," paper presented to the Institüt für Maschinelle Sprachverarbeitung, Stuttgart University, January 31, 1990; to appear.

Bresnan, J. and J. Kanerva (1989) "Locative Inversion in Chicheŵa: A Case Study of Factorization in Grammar," *Linguistic Inquiry* 20.1, 1–50.

Bresnan, J. and J. M. Kanerva (in press) "The Thematic Hierarchy and Locative Inversion in UG. A Reply to Paul Schachter's Comments," in E. Wehrli and T. Stowell, eds., *Syntax and Semantics: Syntax and the Lexicon*, Academic Press, New York.

Bresnan, J. and L. Moshi (1990) "Object Asymmetries in Comparative Bantu Syntax," *Linguistic Inquiry* 21.2, 147–186.

Burzio, L. (1981) *Intransitive Verbs and Italian Auxiliaries,* Ph.D. dissertation, MIT, Cambridge, Mass.

Burzio, L. (1986) *Italian Syntax: A Government-Binding Approach,* Reidel, Dordrecht, The Netherlands.

Carrier, J. and J. Randall (1988) "From Conceptual Structure to Syntax: Projecting from Resultatives," unpublished paper, Harvard University and Northeastern University.

Dowty, D. (1987) "Thematic Proto-roles, Subject Selection and Lexical Semantic Defaults," symposium, Annual LSA meeting, San Francisco, California.

Foley, W. and R. Van Valin (1984) *Functional Syntax and Universal Grammar,* Cambridge University Press, Cambridge.

Grimshaw, J. and A. Mester (1988) "Light Verbs and Theta Marking," *Linguistic Inquiry* 19, 205–232.

Halliday, M. A. K. (1967) "Notes on Transitivity and Theme in English, Part 1," *Journal of Linguistics* 3, 37–38.

Huang, C.-R. (1990) "Mandarin Chinese and the Lexical Mapping Theory—A Study of the Interaction of Morphology and Argument Changing," duplicated paper, Academia Sinica, Taiwan.

Jackendoff, R. (1978) *X' Syntax: A Study of Phrase Structure*, The MIT Press, Cambridge, Mass.

Kiparsky, P. (1987) *Morphology and Grammatical Relations*, ms., Department of Linguistics, Stanford, Palo Alto, California.

Ladusaw, W. (1985) "A Proposed Distinction between Levels and Strata," Syntax Research Center, Cowell College, University of California, Santa Cruz, California.

Levin, B. and M. Rappaport (1986) "The Formation of Adjectival Passives," *Linguistic Inquiry* 17, 623–661.

Levin, L. (1986) *Operations on Lexical Forms: Unaccusative Rules in Germanic Languages,* Ph.D. dissertation, MIT, Cambridge, Mass., published by Garland, New York, in 1988.

Levin, L., M. Rappaport, and A. Zaenen, eds. (1983) *Papers in Lexical Functional Grammar*, Indiana University Linguistics Club, Bloomington, Indiana.

Matsumoto, Y. (1990) "On the Syntax of Japanese 'Intransitivizing' *-te aru* Construction: An Example of a Non-lexical Predicate," paper presented at the Twenty-Sixth Regional Meeting of the Chicago Linguistic Society, April 1990, University of Chicago, Illinois.

Mohanan, T. (1990) *Arguments in Hindi,* Ph.D. dissertation, Stanford University, Palo Alto, California.

Rappaport, M. and B. Levin (1989) "Is There Evidence for Deep Unaccusativity in English? An Analysis of the Resultative Constructions," duplicated, Bar Ilan University and Northwestern University.

Rosen, C. (1981) *The Relational Structure of Reflexive Clauses: Evidence from Italian,* Ph.D. dissertation, Harvard University, Cambridge, Mass., published by Garland, New York, in 1988.

Perlmutter, D. (1978) "Impersonal Passives and the Unaccusativity Hypothesis," *Proceedings of the fourth annual meeting of the Berkeley Linguistic Society*, Berkeley, CA.

Perlmutter, D. (1983) "Personal versus Impersonal Constructions," *Natural Language and Linguistic Theory* 1, 141–200.

Pinker, S. (1989) *Learnability and Cognition: The Acquisition of Argument Structure,* The MIT Press, Cambridge, Massachusetts.

Sells, P. (1989) "VP in Japanese: Evidence from *-te* Complements," to appear in the *Proceedings of the Conference on Japanese and Korean Linguistics, UCLA, August 1989,* CSLI.

Simpson, J. (1983) "Resultatives," in L. Levin, M. Rappaport and A. Zaenen, eds.

Tenny, C. (1987) *Grammaticalizing Aspect and Affectedness,* unpublished doctoral diss, MIT, Cambridge, MA.

Van Valin, R. (1989) "Semantic Parameters of Split Unaccusativity," duplicated, University of California, Davis, California.

Yatabe, Shuichi (1990) "The Representation of Idioms," duplicated, Stanford University, Stanford, California.

Zaenen, A. (to appear) "Unaccusativity in Dutch: An Integrated Approach," in J. Pustejovsky, ed., *Semantics and the Lexicon,* Kluwer Academic Publishers, Dordrecht.