THE SYNTACTIC MANIFESTATION OF NOMINAL FEATURE GEOMETRY*

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0. Introduction

This paper investigates the mapping between the lexical representation of nominal inflectional elements and the structure of the phrases in which they occur. We argue that the distribution of English nominal inflectional morphemes can be derived from a modified version of Halle and Marantz's (1993) Vocabulary Insertion algorithm and a set of geometrically organized privative features (Béjar 1998, 2000; Béjar and Hall 1999; Cowper 1999; Cowper and Hall 1999; Harley 1994; Harley and Ritter 2002; Nevins 2003; Ritter 1997; Ritter and Harley 1998). An example of the puzzles posed by the English nominal system is shown in (1):

(1) a. {*sm / √a} dog {√sm / *a} mud {√sm / * a} dogs

b. {√this / *these} dog {√this / *these} mud {*this / √these} dogs

In (1a), mass nouns are seen to pattern with plural count nouns in permitting the determiner *sm*, but not *a*.[1] In (1b), however, mass nouns pattern with singular count nouns. These and related facts, we argue, follow from a lexical insertion algorithm that is sensitive to both syntactic and feature-geometric structure.

1. The geometry

In the geometry below, [D] and [#] are features with semantic content; they also correspond to the English syntactic category labels D and #. In English, the structure headed by D and the structure headed by # occupy two syntactic projections; other syntactic configurations of the same features may be possible in other languages.[2]

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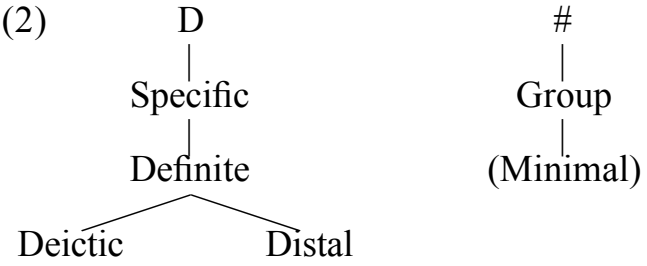
1. On the distinction between *sm* and *some*, see Postal ([1966] 1970: 77 n. 7), Milsark ([1974] 1976: 121).

2. One property that will not be dealt with here is genericity. As can be seen from the data in (i), the full range of nominal forms can be interpreted either generically or non-generically; we

(2)



The semantic content of each feature is given informally below. A formal treatment is beyond the scope of this paper.

[#]: Quantized, individuated. This feature distinguishes count nominals from mass nominals. Contra Gil (1987), we claim that bare NPs in English are not count, but mass. In the absence of [#], even a noun whose lexical semantics favours a count reading (e.g. *alligator*) receives a mass interpretation, as in (3).[3]

(3) a. I've always liked **alligator**.[4]
b. There was **alligator** all over the lawn.

[Group]: Plural. The presence of [Group] entails the presence of [#], and thus forces a count reading, even when the noun is normally interpreted as a mass noun.[5] For example, pluralizing the normally mass noun *coffee* yields readings such as 'servings of coffee' (4a) or 'varieties of coffee' (4b), depending on the context.

(4) a. Sue brought the **coffees** and Fred brought the doughnuts.
b. The **coffees** that are cultivated in Brazil are different from the ones grown in Ethiopia.

[Minimal]: Dual. In languages that make a grammatical distinction between dual and plural number, dual is a marked case of [Group] indicated by [Minimal]. Since this distinction is not grammaticalized in English, [Minimal] need not

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therefore assume that whatever determines generic interpretation is orthogonal to the features we are concerned with here.

(i) a. Mud is good for the complexion. b. An apple a day keeps the doctor away.
c. Elephants are herbivorous. d. This molecule is organic.

We also set aside the question of the representation of grammatical person and gender; see Ritter (1997), Béjar (1998), and Harley and Ritter (2002) for ideas about where these features fit into the geometry.

3. Pelletier (1975) refers to this phenomenon as the Universal Grinder.
4. See also Lee (1974).
5. Bunt (1985) calls this phenomenon the Universal Sorter.

appear in any English #P; its position in the geometry is indicated in (2) simply for the sake of completeness.[6]

The dependence of Minimal on Group predicts the implicational relation between dual and plural typologically, and the parallel implicational patterns in dual-plural syncretisms in the paradigms of individual languages (Harley 1994; Harley and Ritter 1998, 2002; Béjar and Hall 2000).

[D]: (Potentially) referential. This feature, and the corresponding syntactic projection, must be present if a nominal is to serve as an argument. In the absence of [D], a nominal (NP or #P) must be a predicate; in other words it has the semantic type ⟨e,t⟩ and must be interpreted as a property, as shown in (5) and (6). This is not to say that the presence of [D] forces a constituent to be an argument. There is clear evidence that English DPs, both definite and indefinite, can also be predicates, as seen in (7).

(5) a. She was elected [$_{\#P}$ president]. (predicative count noun)
b. This is [$_{NP}$ rubbish]. (predicative mass noun)

(6) *President was elected unanimously.

(7) a. She is a doctor.
b. Mr. Jones is the leader.

In order to be an argument, a nominal has to have the semantic type ⟨e⟩.[7,8] We assume that bare nominal arguments are DPs not NPs. This necessitates a null determiner Ø, which we assume has just the feature [D].

The same predicate-argument opposition can be seen with bare plurals, as expected if #P's are also of the semantic type ⟨e,t⟩:

(8) a. They were considered [$_{\#P}$ idiots].
b. We've gone and hired [$_{DP}$ Ø idiots]!

[Specific]: Denoting a particular individual (or group of individuals), as opposed to quantifying over actual or potential individuals. We will discuss in section 6 our reasons for treating specificity as deriving from the presence of a feature rather than from the scope of a quantifier. A DP that is [Specific] but not also [Definite] typically refers to an individual that is known to the speaker, but not to the hearer.

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6. It might be argued that the word *both* includes the feature [Minimal]. While this may be true, *both* is a quantifier, like *all*, *few*, and *many*, and is not part of the inflectional system we are concerned with here.

7. Rullman (2002) proposes that plural arguments should be of the semantic type ⟨e,t⟩. His proposal is incompatible with the analysis being presented here, and requires more to be said about how to distinguish sets of individuals from sets taken as predicates.

8. We abstract away from the analysis of arguments as generalized quantifiers.

The English determiners that encode the feature [Specific] are unstressed *this* and *these*, as in presentational sentences like (9).

(9) a. So **this giant panda** lumbers into a bar, and….
b. I couldn't do my homework because there were **these really cool shows** on TV.

Unlike *sm*, Ø, and *a*, unstressed *this* cannot appear in a context requiring a nonspecific indefinite, as shown in (10).

(10) a. Bill wants to take **this really easy course**, but he can't find it/*one in the calendar.
b. Bill wants to take **sm really easy courses**, but he can't find any/them in the calendar.
c. Bill is looking for **Ø Brazilian coffee**, but he can't find any.
d. Bill wants to hire **an alligator**, but there aren't any available.

[Definite]: Referentially indexed in the Universe of Discourse. In the default interpretation, a definite DP refers to something already present in the Universe of Discourse (11a), readily inferred (11b), or known to be unique (11c).

(11) a. A giant panda, a bishop, and a rabbi walk into a bar. **The panda** orders a beer.
b. Elizabeth has a guitar. **The strings** are nylon.
c. **The mayor** is a buffoon.

The definite determiner can also be used when the speaker assumes, correctly or incorrectly, that the DP describes an identifiable and unique entity in the Universe of Discourse, as discussed in Donnellan (1966).

Specific entities, once they have been introduced into the discourse, are most felicitously referred to with definite expressions, as in (11a).

[Deictic]: Identified by its relation to the deictic centre. This is a marked case of [Definite] in which the referent need not already be present in the discourse because it is being pointed out by the deictic determiner. The default interpretation of [Deictic] is proximal.

Stressed *THIS* encodes [Deictic], and is thus inappropriate in the presentational contexts that favour unstressed *this*:[9]

(12) #So **THIS giant panda** lumbers into a bar….

(12) is pragmatically odd unless the speaker is pointing to the panda in question or the panda is being contrasted with some other giant panda.

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9. Deictic *THIS, THAT, THESE* and *THOSE* may or not bear stress; the non-deictic versions must be unstressed.

[Distal]: Background. In the absence of [Deictic], [Distal] means "in the background of the discourse"; in the presence of [Deictic] it establishes distance from the Deictic Centre.

(13) a. Do you remember **that giant panda** we were talking about yesterday?
b. Do you mean THIS giant panda (here) or **THAT one** (over there)?

The unstressed *that* in (13a) encodes [Distal]; the stressed *THAT* in (13b) encodes both [Distal] and [Deictic], and is thus the [Distal] counterpart to *THIS*.

2. Feature specifications for the relevant English morphemes

The morphemes of the English D and # system are listed below with their minimal feature specifications. While some encode features of a single inflectional head, others are portmanteau elements encoding features of both D and #. Because of the implicational relations encoded in the feature geometry, a morpheme specified for a dependent feature licenses all dominating features as well; for example, the plural suffix *-(e)s* is specified for [Group] and therefore licenses [#] as well.

(14) *-(e)s:* [group]
Ø: [D]
sm: [D]
a: [D, #]
this: [Specific]
these: [Specific, Group]
the: [Definite]
THIS: [Deictic]
THESE: [Deictic, Group]
that: [Distal]
those: [Distal, Group]
THAT: [Deictic, Distal]
THOSE:[Deictic, Distal, Group]

These feature specifications do not distinguish between *sm* and the null determiner. The difference between them is subtle; it appears to involve the availability of a generic reading.

(15) a. This plant needs [$_{DP}$ Ø water]. Can mean either that the need for water is a chronic, individual-level property of the plant, or that the plant needs to be watered right now.

b. This plant needs [$_{DP}$ sm water]. Can only mean that the plant needs to be watered right now.

The plural suffix *-(e)s*, which encodes [Group], is inserted in the syntactic # projection; all other morphemes in (14) realize features of D and thus are inserted at the DP level, even when they also encode [#] or [Group]. This entails that indefinite nominals can be DPs, which is compatible with the evidence in (16) and (17). In (16), the indefinite *a* is in complementary distribution with the definite

determiners *the, THIS,* and *THAT*. In the context of (17), the NP *president* can be used predicatively, but *a president* cannot.

(16) * {the / THIS / THAT} a dog

(17) We elected her (*a) president.

3. The insertion algorithm

We propose that the morphemes in (14) are inserted into the syntactic structure by an algorithm that follows the basic principles of Halle and Marantz's (1993) Vocabulary Insertion algorithm, but crucially applies cyclically.

Insertion occurs after syntactic operations on a given domain. For the purposes of this paper, we need not adopt a position on the definition of domain. Nothing here depends on whether the domain is as small as a single maximal projection, or as large as a phase as defined by Chomsky (2000).

Insertion is based on degree of specification. To the extent that its feature specifications are nondistinct from the ones in the tree, a more highly specified morpheme is preferred over a less highly specified one (Halle 1997, Halle and Marantz 1993, Kiparsky 1973).

> "The phonological exponent of a Vocabulary Item is inserted into a morpheme […] if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the Vocabulary Item contains features not present in the morpheme. Where several Vocabulary Items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen."
>
> (Halle 1997, quoted in Harley and Noyer 1999)

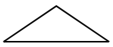
Degree of specification is determined with reference to the feature geometry above. A morpheme specified for a dependent feature is understood to be implicitly specified for all dominating features; for example, *THIS*, which is specified for [Deictic], brings with it [Definite], [Specific], and [D]. *THIS* is thus more highly specified than *the*, *a* or *sm*.

Vocabulary Insertion proceeds cyclically. Each cycle takes into account the features of the current projection and all lower projections (within the same phase, at most). However, features from lower projections play a role in vocabulary insertion only when the current projection does not provide an unambiguous choice. This differs somewhat from the procedure in Halle and Marantz (1993), where Vocabulary Insertion applies to a single node of Morphological Structure at a time.

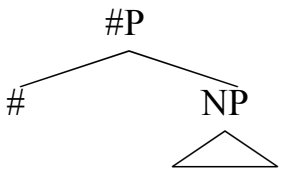
From this, it follows that a feature may be realized on more than one morpheme, but only if those morphemes are inserted on different cycles. For

example, [Group] is encoded both by *-s* and by *these* in *these dogs*. However, it would not be possible to insert two morphemes encoding [D] on the DP cycle: **the a dog*.[10]

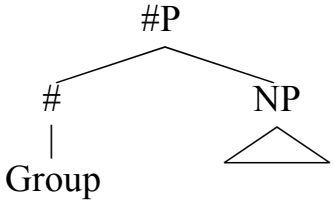
The feature combinations for English nominals are shown in (18).

(18) a. 

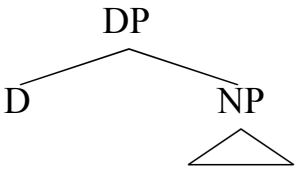
We considered it ***rubbish***.

b. 

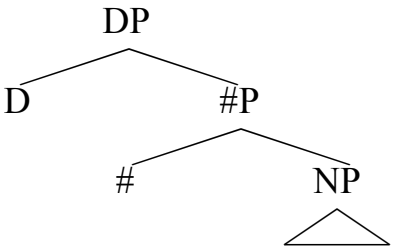
We elected her ***president***.

c. 

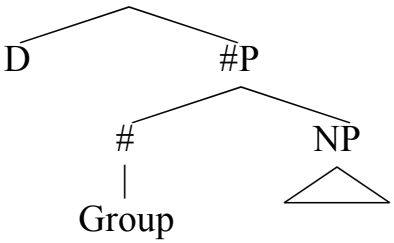
We considered them ***geniuses***.

d. 

The azaleas need ***Ø/sm water***.

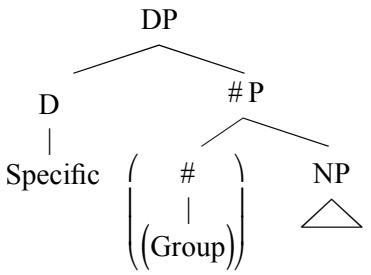
e. 

The azaleas need ***a bath***.

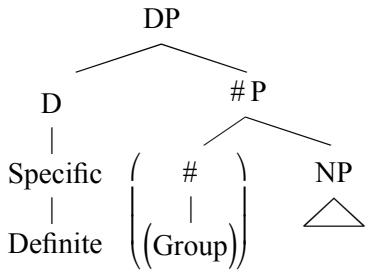
f. 

The azaleas need ***Ø/sm nutrients***.

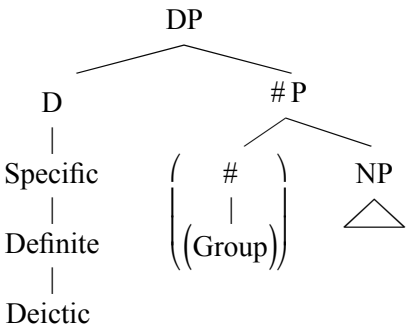
10. Apparent counterexamples, such as *these the seven hills of Prague* or *we the people*, are in fact appositive sequences of two DPs.

. 

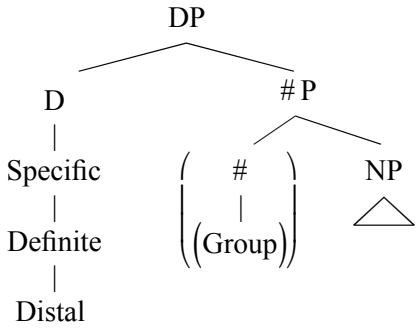
i. *There's* ***this green goo*** *all over the place.*
ii. *There's* ***this movie*** *I want to see.*
iii. *There are* ***these giant pandas*** *following me.*

. 

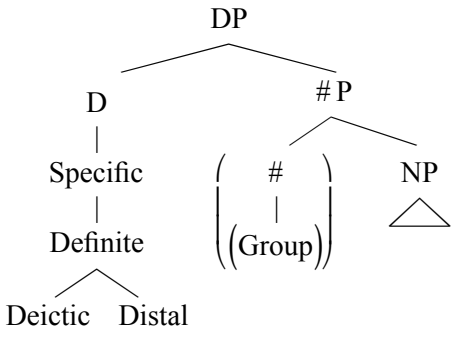
i. *She ate* ***the rice****.*
ii. *She ate* ***the pomegranate****.*
iii. *She ate* ***the pomegranates****.*

. 

i. ***THIS coffee*** *over here is stale.*
ii. ***THIS doughnut*** *over here is stale*
iii. ***THESE doughnuts*** *over here are stale.*

. 

i. ***That coffee*** *you brought was stale.*
ii. ***That doughnut*** *you brought was stale.*
iii. ***Those doughnuts*** *you brought were stale.*

. 

i. ***THAT coffee*** *(over there) is stale.*
ii. ***THAT doughnut*** *(over there) is stale.*
iii. ***THOSE doughnuts*** *(over there) are stale.*

4. The realization of specific indefinites

We have claimed that unstressed *this* and *these* carry the feature [Specific], while the indefinite articles *a, sm,* and Ø carry no features dependent on [D]. Without further stipulation, we would predict that all specific indefinites should have to be expressed with *this* or *these*, rather than with *a, sm* or Ø. However, the sentences in (19) are entirely acceptable paraphrases of the ones in (18g).

(19) a. There's **sm/Ø green goo** all over the place.
b. There's **a movie** I want to see.
c. There are **sm/Ø giant pandas** following me.

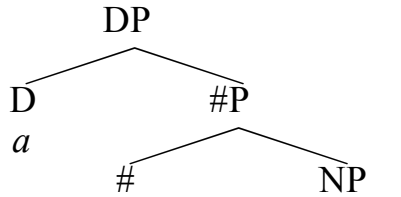
However, there is another difference between *this* and *these* on the one hand, and the other indefinite determiners on the other: *this* and *these* are specified as belonging to a markedly informal register. If the discourse is informal, then *this* and *these* can be used; if not, the best fit for a specific indefinite will be *a* for singular count nominals, and *sm* or Ø for either mass nominals or plurals. We have not incorporated this register feature into the geometry, on the assumption that register is a pragmatic phenomenon orthogonal to the semantics of nominals.

5. Multiple realizations of a single feature

As stated earlier, a given feature may be realized by more than one morpheme provided the two morphemes are inserted on different cycles. Thus nominals such as *these dogs*, in which the feature [Group] is realized both by the plural suffix and by the determiner, are well-formed. An unexpectedly ill-formed nominal is shown in (20a), which has the structure in (20b).

(20) a. *a dogs

b.



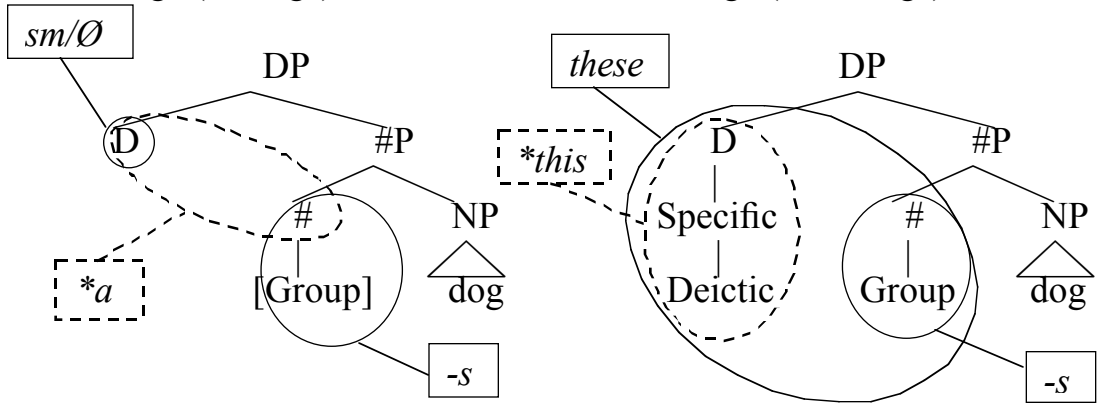
The plural marker *-s* realizes the features [Group] and, by implication, [#]. On the next cycle, the features [D] and [#] are realized by the indefinite article *a*. Nothing in this derivation departs from the insertion algorithm. The well-formed phrase *sm dogs* in fact requires the insertion of a determiner that matches fewer features than a matches.

We hypothesize that (20) is ruled out by a process of freezing as described in (21).

(21) Once a feature has been licensed by vocabulary insertion, all of its dominating features are invisible to later applications of vocabulary insertion.

The insertion of a on the DP cycle in (20) is prohibited by (21) because the insertion of -s on the #P cycle renders the feature [#] invisible. Once [Group] has been realized on the #P cycle, vocabulary insertion on the DP cycle can see [Group] (producing agreement between the determiner and the noun in these dogs), but it cannot see the dominating feature [#].

(22) a. sm/Ø dogs (*a dogs) b. these dogs (*this dogs)



6. Ambiguity of *a* as a consequence of the feature specifications

The feature specifications further predict that the ambiguity between specific and non-specific indefinites should be a consequence of the features of a DP rather than of its scope. This accords with Fodor and Sag (1982), who use data like (23) to argue against a scope-based account of the ambiguity.

(23) Every professor believed the rumour that a student of mine cheated on the exam.

✓ every > the > a: Each professor believed the rumour, which stated that there was (at least) one student of mine who cheated on the exam.

* every > a > the: For each professor p, there was one student of mine s, such that p believed the rumour that s cheated on the exam.

✓ a > every > the: There was a student of mine s such that every professor believed the rumour that *s* cheated on the exam.

The difficulty for the scope-based approach is to allow *a* to be interpreted either *in situ* or above *every*, but not in between. If, however, *a* can be interpreted as specific *in situ*, in the same way that a proper name can be, then there is no need to allow indefinites to raise out of islands at all.

Although a fully formal treatment of the denotation of [Specific] is beyond the scope of this paper, we can say that the ambiguity arises from the fact that (except in the marked informal register) the vocabulary item *a* is the best match for both [D, #] and [Specific, #].

7. Conclusions

The analysis above provides two distinct kinds of support for the notion that nominal inflectional features are organized geometrically. First, and most obviously, the particular geometry proposed here allows for all and only those combinations of features that are realized in the English nominal system. Second, the data discussed in section 5 suggest that the feature geometry also plays a role in regulating the passage of information from the syntactic to the morphological component. Given a cyclic version of Distributed Morphology's postsyntactic vocabulary insertion algorithm, a hierarchically organized set of privative features can fully determine which vocabulary items are inserted at each projection.

References

Béjar, Susana. 1998. *Markedness and Morphosyntactic Representation: A Study of Verbal Inflection in the Imperfect Conjugation of Standard Arabic*. M.A. forum paper, University of Toronto.

Béjar, Susana. 2000. "Structural Markedness in Formal Features: Deriving Interpretability." *Revue québécoise de linguistique* 28: 47–72.

Béjar, Susana, and Daniel Currie Hall. 2000. "Marking Markedness: The Underlying Order of Diagonal Syncretisms." In Daly, Rebecca, and Anastasia Riehl, eds. *Proceedings of the Eastern States Conference on Linguistics (ESCOL) 1999.* Ithaca, N.Y.: CLC.

Bunt, H.C. 1985. *Mass Terms and Model Theoretic Semantics*. Cambridge University Press.

Chomsky, Noam. 2000. "Derivation by Phase." *MIT Occasional Papers in Linguistics.* Cambridge, Mass.: MIT Department of Linguistics and Philosophy.

Cowper, Elizabeth. 1999. "Feature Geometry and Verbal Inflection." In Smallwood, Carolyn, and Susana Béjar, eds. *Toronto Working Papers in Linguistics* 17: 79–96.

Cowper, Elizabeth, and Daniel Currie Hall. 1999. "Semantic Composition and Syntactic Structure: English Inflection." Presented to the Canadian Linguistic Association, Université de Sherbrooke.

Donnellan, Keith S. 1966. "Reference and Definite Descriptions." *The Philosophical Review* 75.3: 281–304.

Fodor, Janet Dean, and Ivan Sag. 1982. "Referential and Quantificational Indefinites." *Linguistics and Philosophy* 5: 355–98.

Gil, David. 1987. “Definiteness, Noun Phrase Configurationality, and the Count–Mass Distinction.” In Reuland, Eric, and Alice G. B. ter Meulen, eds. *The Representation of (In)definiteness*, 254–69. Cambridge, Mass.: MIT Press.

Halle, Morris. 1997. “Distributed Morphology: Impoverishment and Fission.” *MITWPL* 30*:* 425–449.

Halle, Morris, and Alec Marantz. 1993. “Distributed Morphology and the Pieces of Inflection.” In Hale, Kenneth, and Samuel J. Keyser, eds., *The View from Building 20*, 111–76. Cambridge, Mass.: MIT Press.

Harley, Heidi. 1994. “Hug a Tree: Deriving the Morphosyntactic Feature Hierarchy.” *MITWPL* 21: 289–320.

Harley, Heidi, and Rolf Noyer. 1999. “State-of-the-Article: Distributed Morphology.” *Glot International* 4.4: 3–9.

Harley, Heidi, and Elizabeth Ritter. 2002. “Person and Number in Pronouns: A Feature-Geometric Analysis.” *Language* 78.3: 482–526.

Lee, Dennis. 1974. *Alligator Pie.* Toronto: Macmillan.

Milsark, Gary. [1974] 1976. *Existential Sentences in English.* Doctoral dissertation, Temple University. Bloomington, Indiana: IULC.

Nevins, Andrew Ira. 2003. “Do Person/Number Syncretisms Refer to Negative Values?” Presented at the 77th annual meeting of the Linguistic Society of America, Atlanta, Ga., January 2003.

Pelletier, Francis J. 1975. “Non-Singular Reference: Some Preliminaries.” *Philosophia* 5.

Postal, Paul. [1966] 1970. “On So-Called Pronouns in English.” In Jacobs, Roderick A., and Peter S. Rosenbaum, eds. *Readings in English Transformational Grammar*, 56–82. Waltham, Mass.: Ginn.

Ritter, Elizabeth. 1997. “Agreement in the Arabic Prefix Conjugation: Evidence for a Non-Linear Approach to Person, Number, and Gender Features.” *Proceedings of the 1997 Annual Conference of the Canadian Linguistics Association.* Calgary: University of Calgary, Department of Linguistics.

Ritter, Elizabeth, and Heidi Harley. 1998. “Meaning in Morphology: A Feature-Geometric Analysis of Person and Number.” Presented at GLOW, Tilburg.

Rullman, Hotze. 2002. “Number Agreement in Pronouns: Syntax or Semantics?” Presented to the Canadian Linguistic Association, University of Toronto, May 2002.