Book review.

Chris Wilder, Hans-Martin Gärtner, and Mandred Bierwisch, eds., *The Role of Economy Principles in Linguistic Theory*. Berlin, Akademie Verlag, 1997. (Studia Grammatica 40.) pp. 298. ISBN 3-05-002897-1.

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Introduction

The 40th volume in the Studia Grammatica series is a collection of 9 articles, plus introduction, on the subject of economy principles in linguistic theory. Here, 'economy' is not just understood as a required feature of the *description* of grammatical phenomena (which is commonplace), but as a property of language itself. The notion of grammar as a system operating in a maximally economical way emerged in the Principles and Parameters theory of generative grammar (Chomsky 1991) and is frequently mentioned as a defining characteristic of the most recent stage of generative grammar, the so-called minimalist program (Chomsky 1995). Consequently, most authors contributing to this volume address the question of the role of economy principles in linguistic theory from the point of view of the minimalist program.

The volume contains one article on expletive constructions (John Frampton, Expletive Insertion, 36-57), four articles on optional movement, mostly German and Dutch 'scrambling' (Günther Grewendorf and Joachim Sabel, Wh-scrambling in the minimalist framework, 58-80; Wolfgang Sternefeld, Comparing Reference Sets, 81-114; Gereon Müller, Optional Movement and the Interaction of Economy Constraints, 115-145; Tanya Reinhart, Interface Economy and Markedness, 147-169), two articles on the general characterization of economy principles in syntax (Juan Uriagereka, Formal and Substantive Elegance in the Minimalist Program, 170-204; Hubert Haider, Economy in Syntax is Projective Economy, 205-226), and two articles on economy principles in the Lexicon and/or the morphological component of the grammar (Manfred Bierwisch, Lexical Information from a Minimalist Point of View, 227-266; Dieter Wunderlich, A Minimalist Model of Inflectional Morphology, 267-298). These articles are preceded by a useful, but somewhat dense introduction on economy principles in linguistic theory (Chris Wilder and Hans-Martin Gärtner, Introduction, 1-35).

This book undoubtedly makes a welcome addition to the minimalist literature, and compulsory reading for anyone interested in the role of economy principles in linguistic theory. The authors generally strike a pleasantly critical tone, and a common concern with questions of the shape and scope of economy principles in linguistics is apparent. The book's usefulness could have been increased, however, if it had been provided with an index and a general bibliography, and if the numerous endnotes would have been turned into footnotes.

Economy I and II

So what is the role of economy principles in linguistic theory? In their introduction, Wilder and Gärtner waste no time in pointing out the crucial distinction (insightfully discussed by Bierwisch as well) between economy as an evaluation metric, "a principle governing the way we go about constructing theories" (p.2), which they call *Economy I*, and economy as "a property of the object of study, i.e., a constitutive principle in the design of language" (ibid.), which they call *Economy*

II. Economy I tells us to adopt the simplest analysis of a given phenomenon, a general methodological requirement, often mistakenly identified with Occam's Razor (also in this volume; the simplest analysis often requires the postulation of unknown entities, potentially in violation of Occam's Razor). Economy II presupposes that language itself is maximally simple, for example in involving a maximally limited number of symbols or operations. A typical instantiation of Economy II would be that a certain construction does not occur in a given language because its derivation would involve too many steps. More generally, the quest for Economy II raises the question to what extent language is a 'perfect' system (Chomsky 1995:221).

The two notions of economy are not necessarily related: the grammar could be hopelessly convoluted, violating Economy II, and we would still have to subject our description of it to the requirements of Economy I. But a common strategy in scientific pursuits is to start from the hypothesis that the laws governing the universe can only be detected by a rigorous application of Economy I, *because* they are themselves maximally simple, i.e., characterized by Economy II. The minimalist program deserves attention, not for the various technical proposals made in connection with it, but for its attempt to bridge the gap between Economy I and Economy II in linguistics.

A simple example may illustrate the issue. Morphological paradigms are generally thought to be organized in pairs of marked and unmarked members, the unmarked member being underspecified for a given feature (Jakobson 1935). As noted in Bierwisch's contribution, underspecification in linguistics is the direct result of the implementation of Economy I (p. 227). Wunderlich's 'minimalist model of inflectional morphology', which seeks to exploit underspecification to its full potential, appears to be inspired by Economy I more than by Economy II, especially in its brief comparison of 'minimalist morphology' to alternative approaches (pp. 273-277). But Wilder and Gärtner suggest that underspecification is not just in the eye of the beholder (p. 12): "Taken as a property of the domain of study, underspecification may then be viewed as reflex of a substantive economy principle governing possible format of lexical entries (Economy II)." In other words, the reason that underspecification is such a useful tool in describing, say, inflectional paradigms, is that language itself organizes its paradigms in a maximally economical way. Thus, the fact that oppositions can generally be characterized in terms of a marked and an unmarked value may be taken to imply that language—as a product of our cognitive capacities—uses something like Economy II in shaping the linguistic material it employs.

The minimalist program seeks to investigate to what extent language is a perfect solution of requirements set by various components of the mind brain: the components having to do with vocabulary (the Lexicon), sound (the articulatory-perceptual component, or A-P), and meaning (the conceptual-intentional component, or C-I). An individual sentence is the result of a procedure combining elements from the Lexicon to create representations PF and LF that can be interpreted by A-P and C-I, respectively. Each of the representations PF and LF must be maximally simple (economy of representation); Chomsky (1995) implements this by hypothesizing that PF and LF may not involve symbols that cannot be interpreted by A-P and C-I, respectively. Furthermore, the operations leading to PF/LF (the 'derivation') must be maximally simple (economy of derivation). This is implemented by Chomsky (1995) in various ways: the steps in the derivation must be both few and short, and the structure resulting from the derivation must be 'bare'. Both economy of representation and economy of derivation are instantiations of

Economy II. The question of how to make these economy requirements work is the main subject of the contributions to the volume under review.

The individual articles

John Frampton, Expletive Insertion

This article is of some historic interest, because it contains an early discussion of various innovative aspects of Chomsky's (1995) Chapter Four. These include the distinction between ±interpretable features (p. 38), the notion of attraction by a functional head as the force driving displacements (p. 39), and the notion of an 'EPP-feature' driving movement to a specifier position (p. 42).

An early implementation of the 'fewest steps' requirement of economy of derivation, called Greed, restricts movement to those cases where movement of α would result in one of α's features being checked. Various problems associated with that concept (the decision whether to move or not must be made on the basis of events taking place in a later stage of the derivation—'look-ahead'—, successive cyclic movement is not possible since the relevant features triggering movement would be checked and removed after the first step, etc.) are eliminated if movement is restricted by looking at the target of movement only: movement to α is triggered by a feature of α that needs to be checked, and α 'looks for' elements that it c-commands that could perform the checking operation. The idea that checking involves elimination of features, ultimately motivated by the prohibition against superfluous symbols at the interface representations (economy of representation), is modified by the assumption that only features that cannot be interpreted at the interfaces need to be eliminated; +interpretable features remain even after checking, and may make successive cyclic movement possible. These are important refinements of the process of movement, even if further questions need to be asked.

Frampton's article concentrates on the nature of expletive constructions, a familiar topic discussed repeatedly in Chomsky (1995). Like Chomsky, Frampton assumes that expletives are essentially meaningless elements, inserted in the structural subject position at some point in the derivation, in order to check the EPP-feature (meaning: 'because the sentence needs a subject'). The insertion operation ('Merge') is costless, whereas movement is not. In view of this, it is surprising to find pairs like:

(1) There INFL is a man in the room
(2) A man INFL is in the room

Observance of economy of derivation would predict (1) to block the derivation of (2). Frampton's proposal is that *a man* is an NP in (1), but a DP in (2). The subject must be an element carrying the categorial feature D (i.e., the EPP-feature must be checked by D), so the NP *a man* (which lacks the D-feature) in (1) is not attracted by the EPP-feature of INFL, and an expletive (a determiner element carrying *only* a D-feature, in this proposal) is inserted. In (2), however, *a man* is a DP, attracted by INFL because of its D-feature which checks INFL's EPP-feature, and expletive insertion can be avoided. To make the analysis complete, Frampton is forced to propose that expletive insertion, though an instance of Merge, is truly a last resort option, chosen only after the more costly operation of Move (p. 48):

(3) *Order of operations*
1. Merge
2. Move (Attract)
3. Expletive insertion

The order in (3) is motivated by taking recourse to the notion of a 'numeration': a selection of elements from the Lexicon which will feature in the derivation. Expletives are not in the numeration, in Frampton's proposal, and 'Merge over Move' is defined over elements in the numeration. Insertion of elements not in the numeration is apparently more costly than any kind of manipulation of elements in the numeration, and will only occur in the particular circumstance that INFL cannot find any element to attract in the numeration or in the structure derived so far.

Frampton furthermore proposes that the relation between the expletive and its associate (the NP *a man* in (1)) is an instantiation of the relation between N and D familiar from studies of noun phrase structure (e.g. Longobardi 1994). Thus, in (1) the head of the NP *a man* adjoins to *there* (attracted by a pertinent feature of the expletive). Now it is well known that the associate in an expletive construction does not need to be indefinite, as long as it is nonspecific (cf. Woisetschlager 1983):

(4) a. There was the vigor of a young man in his step
b. There was a young man's vigor in his step

Here it is clear that the associate is not an NP but a DP (Frampton, p. 46). This would seem to jeopardize Frampton's analysis, both the expletive insertion part (movement of the DP should have blocked expletive insertion, by (3)), and the N-to-D raising part. But Frampton (p. 47) comes up with an inventive solution, capitalizing on Baker's (1988) analysis of possessor raising, which it would be worth taking a closer look at.

Frampton's article raises the important point of comparing different derivations starting from a single numeration. This is the topic of the next three articles in the volume.

Grewendorf & Sabel, Wh-scrambling in the Minimalist Framework
Sternefeld, Defining Reference Sets
Müller, Optional Movement and the Interaction of Economy Constraints

Choosing the most economical derivation implies comparing derivations. The minimal way of comparing derivations, argued for in Collins (1994), appears to be purely 'local': at any given point in a derivation, a decision is made how to proceed (e.g., Merge or Move), and the most economical continuation at that point is selected. No information from eventual later stages of the derivation can influence the decision. I believe there is a general concensus that this is the ideal implementation of economy of derivation, but for some reason some form of 'global' economy continues to be contemplated in current work. A 'global' implementation of economy of derivation would involve a comparison of complete derivations, with ensuing problems of computational complexity (Johnson and Lappin 1997).

Chomsky (1995:227) proposes that a 'reference set' of alternative derivations is associated with each derivation, curbing the computational complexity somewhat. If we go along with that, a major question would be how to define the reference set for each derivation. Anyone interested in this question is advised to peruse Sternefeld's contribution, which shows in a painstaking manner the kind of problems one incurs when trying to settle on a particular definition of 'reference set'. Sternefeld concludes that "the transderivational device should be dispensed with in the most simple (i.e. economical) theory of grammar" (p. 81), indeed, "that the transderivational theory is hardly more explanatory than a derivational or even a representational one" (p. 112).

On the other hand, Müller argues that the transderivational conception of economy of derivation allows one to derive the various effects of improper movement (explained in a more stipulative way by the Principle of Unambiguous Binding (PUB) of Müller and Sternefeld 1993) from the interaction of 'standard' economy constraints like Fewest Steps and Last Resort (p.

136). Fewest Steps, in his definition, is transderivational, using as reference set the set of convergent derivations starting from the same numeration (p. 117). (Last Resort is the standard conception of movement as needing a trigger, an effect of Economy I.)

Naturally, after reading Sternefeld's paper, one is inclined to be skeptical about Müller's result. One of the relevant facts is (5), where the derivation in (6) needs to be excluded:

(5) * Was weisst du nicht wie man repariert?
what know you not how one repairs

(6) $[_{WhP}$ Was$_i$ weisst du nicht $[_{WhP}$ wie$_j$ $[_{TopP}$ t_i [man t_j t_i repariert]]]]

In (6), the CP-system involves two different layers, a WhP for wh-elements (called 'CP' by Müller) and a TopP for topics. The embedded Spec,WhP is occupied by *wie*, creating a standard Wh-island configuration. Topicalization into the matrix clause is allowed, as shown by Fanselow's (1987):

(7) Radios weiss ich nicht wie man repariert
radios know I not how one repairs

but wh-movement is not (5). In the earlier theory, a condition barring improper movement from one type of A'-position to another type of A'-position, the PUB, sufficed to explain the ungrammaticality of (5). Müller argues in his present contribution that (5), in particular under the analysis in (6), can also be derived from standard economy constraints (p. 137). One crucial assumption is that *was* in (5) may or may not have the relevant feature [top] triggering movement to TopP. If not, (6) will not occur because *was* will not be attracted to Spec,TopP (Last Resort). But if *was* does have the [top] feature, "this derivation is ruled out by Fewest Steps because there is an alternative derivation that converges (...) but involves one instance of feature checking fewer; this derivation involves one-swoop wh-movement across the wh-island" (p. 137). (I suppose that the result of this shorter derivation would still be ungrammatical—though converging?—because of the 'shortest move condition', cf. p. 125.)

A less technical way of deriving the effects of the PUB, not referring to transderivational constraints, would be to say that different functional heads (e.g. Wh and Top in (6)), simply attract different types of features (hence, different types of phrases) to their specifier positions. As a result, Last Resort suffices to allow (7) and bar (5). The derivation in (6) will not occur, if wh-elements (focus elements) are incompatible with a [top] feature, a reasonable thing to say.

The viability of such an alternative underscores Sternefeld's point that crucial reference to transderivational economy conditions may be avoided altogether.

Sabel and Grewendorf address similar empirical material to Sternefeld and Müller: scrambling and topicalization. But unlike Müller, Sabel and Grewendorf never take recourse to transderivational economy conditions. Their use of economy of derivation is always strictly local: constructions are excluded because their derivation would involve a movement step that is not triggered by feature checking requirements. The article contains a careful comparison of short and long scrambling of wh-elements in German and Japanese.

Reinhart, Interface Economy and Markedness

This paper takes a rather different approach to economy. It assumes that the stress shift involved in marked patterns of sentence intonation comes at an economical cost, and that languages prefer to resort to cost free syntactic operations if they yield the stress shift automatically. This interplay of movement and stress shift is illustrated with object shift in Dutch, where it is assumed that the

pattern in (8)—essentially, nonadjacency of the object and the verb—is derived without cost (by merging the adverb in various positions, as in Zwart 1993:89):

(8) OBJECT—ADVERB—VERB

It is furthermore assumed that the word order in (8) has the automatic effect that the nuclear pitch accent indicating wide focus, which is realized on the object in the unmarked case, following Cinque (1993), shifts to the verb. Such a stress shift is always possible, even when no adverb intervenes between the object and the verb, but in that case the shift would have a certain cost, whereas in (8) it is derived automatically as a side effect of scrambling.

The picture that emerges entails that violations of economy (stress shift without object shift) yield markedness, rather than ungrammaticality, a significant departure from the standard view of the role of economy since Chomsky (1991).

It is unfortunate that Reinhart illustrates her idea with a remarkably careless discussion of the relevant facts from Dutch. Crucial judgments like (6a), (7a), (8d), (40b), (49c) are wrong, mainly because the variables *position* and *intonation* are not distinguished (see Zwart 1995). To give a concrete example, Reinhart's (6a), repeated here as (9), is fully grammatical under the intonation indicated:

(9) Ik heb gisteren het boek geLEzen en niet verSCHEURD
I have yesterday the book read and not torn-up

For a native speaker, it is quite surprising to read that "the judgments in (6)-(7) are solid and clear" (p. 149). They are, of course, but not in the way indicated by Reinhart.

Reinhart's position seems to require that the following stress patterns do not occur (where the stressed element is in boldface):

(10) a. **OBJECT**—ADVERB—VERB
b. ADVERB—OBJECT—**VERB**

Both, however, are perfectly possible, and, in fact, it can be shown that (10a) is the neutral, focus projecting, intonational pattern (Zwart 1997:92ff). This is obscured by the circumstance that the object in (10a) will generally be a definite noun phrase, so that it represents old information, leading to destressing. But this is a fact of usage, not of grammar.

In a pragmatic sense, then, the patterns in (10) are marked, but standard tests indicating neutral intonation (such as the association with *only* test, cf. Rochemont 1986, which Reinhart ignores) indicate that these marked patterns are in fact neutral from a grammatical point of view. All this casts serious doubt on Reinhart's view of the interplay of word order and intonation in Dutch. To the best of my knowledge, object shift simply does not have the function of sparking a stress shift, and the cooccurrence of object shift and destressing of the object is best understood as the result of a conspiracy of various independent factors (see Zwart 1995, 1997).

Uriagereka, Formal and Substantive Elegance in the Minimalist Program
Haider, Economy in Syntax is Projective Economy

The next two articles raise the discussion to a higher level. Uriagereka discusses economy (elegance) in connection with similar concepts in evolutionairy biology and in the physical sciences. He stresses that a linguistic phenomenon "may be an emergent property—like the spiral pattern in a snail shell—which arises dynamically from various systemic interactions" (p. 173).

Of course, we should be interested not so much in describing the phenomenon, as in "learning something deeper about what is behind that very pretty pattern" (p. 198).

This strategy is applied to the phenomenon of obviation in pronouns, where the pattern is derived via the interaction of two structural relations (command and locality) and one interpretive relation (having to do with assigning reference). Command more or less equals traditional c-command, derived along the lines of Epstein (1995). Locality is defined in such a way that it describes the domain for various 'L-related' phenomena (head movement, theta-role assignment, A-movement, Case assignment, local anaphoric binding, and local obviation). The question Uriagereka asks is why local obviation should make use of the same type of locality as the other phenomena listed, and his answer relates obviation to Case assignment.

Uriagereka argues that Case is a formal device for marking noun phrases (sets of features) for distinctness. Local obviation, then, "is the semantic price of Case" (p. 189). Local anaphoricity (binding) only occurs when the pronoun is complex (involving an additional morpheme like *self* or *same*, or a possessive body-part construction) which may annul the obviation. Reflexives are again of a different nature, involving raising to or towards the antecedent (a phenomenon described as 'chain fusion') which has the automatic effect of anti-obviation.

Uriagereka's analysis stresses the relevance of a single local domain for binding and A-movement, familiar from the Principles and Parameters theory (Chomsky 1981), but somewhat obscured in more recent approaches.

Haider's highly original contribution proposes to study economy as a property of the cognitive operations involved in *processing* rather than *generating* linguistic expressions ('projective economy'). What speakers do is project a syntactic structure onto a given string of terminals, and success in describing how that works (the projection problem) is the measure for the empirical adequacy of a theory of grammar (p. 205).

Haider's approach leaves no room whatsoever for 'derivational economy', let alone transderivational economy. An important point is that these concepts of economy are left dangling in the absence of a 'limited resource' enforcing them. Projective economy, in contrast, is enforced by the limited resource of time (p. 208).

Not surprisingly, Haider's angle yields different insights from the standard minimalist theory, leaving no room for LF as a syntactic level of representation (p. 210). Perhaps more remarkably, many features of minimalism can be derived from the projective approach as well, such as the extension requirement (p. 211) and bare phrase structure theory in general ("project the minimal convergent structure", p. 214).

What we are left with is a kind of "representational economy: Don't project more structure onto a string than is required for a convergent structure assignment" (p. 209). This, of course, is remarkably close to Economy I, equating the tasks of the linguist and the language learner.

Bierwisch, Lexical Information from a Minimalist Point of View
Wunderlich, A Minimalist Model of Inflectional Morphology

The final two chapters take a minimalist approach to the representation of lexical information (Bierwisch) and inflectional morphology (Wunderlich).

Bierwisch's article is an exploratory discussion of the representation of lexical information, in the tradition of Jackendoff (1990), Hale & Keyser (1993), and Pustejovsky (1995). Bierwisch notes the tension that holds between two conceptions of the nature of lexical information: on the one hand the traditional concept of lexical information as being idiosyncractic, and on the other hand the idea that lexical information must somehow be 'optimally coded', i.e. subject to economy conditions having to do with the structure of lexical

information and its effect on syntax. In connection with this, Bierwisch distinguishes within 'I-Language' (in the sense of Chomsky 1986) a set of rules and principles (RP-I) and a Lexical System, which in turn consists of a second set of rules and principles (RP-II) and a set of lexical entries. RP-II is tentatively regarded as a "language specific implementation of principles of UG" (p. 258).

Wunderlich's study discusses economy principles in the organization of inflectional morphology, more particularly in a procedure he calls 'paradigm construction'. He proposes a model of 'minimalist morphology' where word formation rules, affix templates, rules of referral, and other concepts of current thinking in morphology are as absent from morphology as phrase structure rules, word order parameters, and indexing mechanisms are from minimalist syntax. The model proposed by Wunderlich (a 'discovery procedure', p. 274) involves the construction of paradigms out of sets of unanalyzed inflected forms, by setting up pairs of marked and unmarked (underspecified) members.

The article contains a useful comparison of minimalist morphology to other current theories of morphology (of Halle & Marantz, Carstairs-McCarthy, Stump, Lieber, Inkelas, and Corbett & Fraser, p. 273-277), as well as two detailed studies of notoriously complex systems of inflectional morphology, Georgian and Potawatomi verb forms—the ordeal for any theory of morphology (cf. Anderson 1992 and Halle & Marantz 1993).

In his concluding remarks, Wunderlich explicates the interaction of syntax and inflectional morphology, proposing that the numeration does not contain stems or lexemes, but entire paradigms, with selection of the optimal member in the course of the Spell-Out procedure (a departure from the simplest account, according to Chomsky 1999:8). Here, I would have liked to see some discussion of the alternative, where minimalist syntax and minimalist morphology operate independently, and interact only at the point of Spell-Out to select the inflected form which best meets the feature specification of the terminal to be spelled out.

Conclusion

Discussion of the role of economy principles in linguistic theory tends to follow a charted course, with principles like 'Fewest Steps' or 'Shortest Move' being treated as sacrosanct. The editors and contributors are to be congratulated on having produced a volume that explores the subject in many, often diverging ways, providing food for thought on a variety of closely related topics.

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