Morphological productivity

By Laurie Bauer

ISBN 052179238X.

Reviewed by John R. Roberts
SIL International

Morphological productivity is one of the most contested areas in the study of word formation. In this research volume Bauer reviews the significant contributions of scholars to the subject over the past 20–30 years. (As a caveat, amongst the 300 or so references to those who have made a contribution only one was to an SIL scholar, and that was Pike 1967). His chapters range over all the key areas of the subject, such as a definition of the notion of morphological productivity, type and token frequency, transparency and opacity of morphological categories, regular and irregular forms, markedness and naturalness, default versus majority morphological processes, rule-governed versus analogy-governed word formation, binary versus scalar productivity, and the psycholinguistic evidence about productivity. In each case he assesses the research and arguments of different scholars (often conflicting) and attempts to reach a conclusion of which argument is the strongest. For example, on the debate as to whether word forms or morphemes are the basic unit of the mental lexicon, Bauer decides that psycholinguistic evidence in favour of a distinct treatment of regular and irregular forms is conclusive evidence against the amorphous model of Anderson (1992).

In his discussion Bauer argues for a rule-governed basis for morphological productivity in preference to word formation being based upon analogy by association, as in the theory of PARALLEL DISTRIBUTED PROCESSING or CONNECTIONISM developed by Rumelhart and McClelland (1986). Bauer also maintains that rule-governed morphological productivity applies to both inflectional and derivational forms and that inflection and derivation are prototypical categories rather than classical (Aristotelian) categories. Psycholinguistic evidence shows that transparent derivatives (where the affixes concerned are transparently attached to their bases), like inflections, are stored in analysed form, i.e., morphemically. This blurs the traditional distinction between inflectional forms (produced on-line by morphosyntactic rules) and derivational forms (retrieved as fully formed stems from the lexicon). Support for this view and a cognitive account of how the mind works with regard to regular and irregular forms can be found in Pinker (2000). Pinker argues (convincingly, in my opinion) that regular (default) forms pattern like classical categories and irregular forms pattern like prototypical categories. Pinker’s thesis is that the human mind is a hybrid system, learning fuzzy associations and crisp rules in different subsystems. Regular forms are produced by computational rules of symbol combination and irregular forms are retrieved from an associative memory. If these very different cognitive
systems are involved in producing regular and irregular inflectional forms then there is no reason to doubt that they are both involved in producing transparent and opaque derivatives. However, Bauer does not refer to Pinker (2000).

In chapter 1 Bauer introduces the issues in morphological productivity that he wishes to address and then proceeds to answer these questions throughout the book. Some of the issues and the answers he proposes are:

a. **Q:** Is it useful to distinguish between “productivity” and “creativity” in morphology?

   **A:** After considering various views and opinions Bauer suggests that productivity and creativity can be distinguished as hyponyms of “innovation,” where productivity is a morphological process that is rule-governed and creativity is not rule-governed (p. 64).

b. **Q:** Are there several meanings for the term “productivity,” and if so do they conflict?

   **A:** Bauer notes that there are at least six different definitions of productivity in the literature (p. 25). These definitions are in terms of: (a) the frequency of the output words, (b) the number of available bases, (c) the proportion of words actually used to the number of words potentially created by a particular process, (d) the possibility of forming new words, (e) the probability of new words forming, and (f) the number of new words occurring in a specified period of time. After discussion Bauer concludes that productivity is a rule-governed process and the productivity of a morphological process is its potential for repetitive noncreative morphological coining (p. 98).

c. **Q:** Is productivity a yes/no matter or is it a matter of gradient?

   **A:** Bauer notes that in the literature there are diametrically opposed answers to this question. Some linguists assert that a morphological process is either productive or not productive, while others assert that productivity is clearly scalar (p. 125). The view expressed depends largely on the framework the linguist is working in. It also depends on how you account for constraints on productivity, which can be phonological, morphological, syntactic, semantic, lexical, pragmatic, aesthetic or blocking (pp. 128–139). However, constraints are not the only factor controlling the number of potential words a particular morphological process can produce. The main point is that words are only formed as and when there is a need for them, and such a need cannot be reduced to formal terms. Thus low type frequency can be constraint-restricted or usage-restricted. This means that even if you discount the constraint restrictions on productivity the need driven usage restrictions would allow productivity to be scalar (p. 143).

d. **Q:** If it is a matter of gradient, does this imply that it is measurable on some scale?

   **A:** Bauer looks at the proposals for measuring productivity. Each of these methods is expressed in a formula:

   \[ P = \frac{V}{S} \]
where \( V \) is the number of types, \( S \) is the number of types which the word formation rule could give rise to, and \( P \) is the index of productivity.

\[
P = \frac{n_1}{N}
\]

where \( n_1 \) is the number of words formed by the appropriate process occurring in a corpus precisely once (i.e., *hapax legomena*), \( N \) is the total token frequency of words created by that morphological process in the corpus and \( P \) is the index of productivity.

\[
P^* = \frac{n_1E_t}{h_t}
\]

where \( n_1 \) is the number of words formed by the appropriate process occurring in a corpus precisely once (the *hapax legomena*), \( E \) indicates the appropriate morphological category, \( t \) indicates the number of tokens in the corpus, \( h \) is the number of hapaxes and \( P^* \) is the index of productivity.

Bauer points out the inadequacies of each of these methods for calculating productivity. He suggests an alternative way to calculate productivity in terms of rate of additions over a period of time, but here it is impossible to estimate accurately the time differential between the two sets of measurements. His conclusion is that the best methods for measuring productivity currently available only give an indirect measure.

In his conclusion Bauer proposes some key ideas to unify the view of morphological productivity. First of all, he proposes a rule-based approach over against an analogy-based approach, primarily because under a rule-based approach it is possible to have ungrammatical formation. For example, under an analogy-based approach there would be nothing to account for the ungrammaticality of a possible word in English such as *ungo*. The other key ideas he proposes are AVAILABILITY and PROFITABILITY. A morphological process is available if it can be used to produce new words as they become necessary. Availability is a yes/no question: either a morphological process is available or it is not. Statements of availability are also temporally limited. What is available in one period may not be in the next. A morphological process is profitable to the extent that it may be used or has been used to produce large numbers of new words. Profitability can be restricted by variable constraints (as listed above) or need driven usage. Availability and profitability interact to constrain the number of words in the lexicon of the individual speaker which are coined according to the pattern provided by any particular morphological process.

Bauer concludes with a definition of productivity (p. 211):

“Productivity” deals with the number of new words that can be coined using a particular morphological process, and is ambiguous between the sense “availability” and the sense “profitability.” The availability of a morphological process is its potential for repetitive rule-governed morphological coining, either in general or in a particular well-defined environment or domain. The profitability of a morphological process reflects the extent to which its availability is exploited in language use, and may be subject unpredictably to extrasystemic factors.
Bauer also proposes that the notions of availability and profitability can be usefully extended to other areas of linguistic enquiry, such as syntax and phonology.

In sum, Bauer provides a critical overview of morphological research and theory from the perspective of morphological productivity. He points out the failings of a number of proposals and highlights the fact that we do not have a method of measuring morphological productivity directly. On the other hand, he supports a number of notions, such as productivity being rule-governed and scalar. Bauer also suggests clarification of some notions, e.g. that productivity and creativity are types of innovation and productivity is rule-governed while creativity is not, that low type frequency can be constraint-restricted or usage-restricted, and that transparency depends on the factors of uniformity (uniform = one meaning to one form, nonuniform = allomorphy) and monofunctionality (monofunctional = one meaning to one form, multifunctional = polysemy and homophony).

In the fly cover it says the contents of this research volume address questions of how the brain treats words containing different kinds of affixes, such as -ness and -ity. Although Bauer discusses these matters in great depth it is not clear to me that he comes up with a theory of cognitive morphology that accounts for how the brain handles morphological productivity. Pinker (2000), on the other hand, provides such a theory.

**References**


