

Note:

Of the following three contributions, "Principled limitations on productivity in denominal verbs", by James H. Rose, "On constraining the production of denominal verbs", by William E. Cooper, and "Invention and innovation in denominal verbs", by James H. Rose, only the last is published for the first time. The first two, which appeared in Foundations of Language 10 (1973), 509-526 and 12 (1975), 397-399, are here, with permission from their authors, reprinted, so as to have the entire discussion complete.

The Editor

PRINCIPLED LIMITATIONS ON  
PRODUCTIVITY IN DENOMINAL VERBS

ABSTRACT. The fact that morphological elements characteristically represent several derivational relationships, and any given relationship is typically marked by multiple morphological means has led to an assumption of basic irregularity in derivational phenomena. Creativity in this area, coupled with the limited range of variation and the relatedness of the variants within that range, in both Indonesian and English, suggests a highly constrained system for the expression of cognate noun: verb relationships.

Beside the nouns water, pocket, skin, father, etc. which appear in the verbal expressions water the lawn, pocket the money, skin the cat, father a child, there are many nouns which do not serve as the basis for such verbs (e. g. automobile, building, etc.). That is to say, the productivity of this derivational process which Jespersen (1933:71) referred to as 'grammatical homonymity' appears in some sense to be limited. Furthermore, different nouns bear different relationships to the verbs derived from them (water the lawn means 'apply water to the lawn' while skin the cat means 'remove the skin from the cat'). As Bloomfield pointed out,

[...] the semantic relations are not grammatically definable. Thus, we derive a great many verbs from nouns by means of various changes, including a zero-element, but the meanings of these derived verbs in relation to the underlying noun are manifold: to man, to dog, to beard, to nose, to milk, to tree, to table, to skin, to bottle, to father, to fish, to clown, and so on. (1933 : 238-9)

More recently, Chomsky has raised these issues of LIMITED PRODUCTIVITY and RELATIONAL VARIATION as determinants of a lexical as opposed to a transformational treatment of derivational processes. On the latter issue, Chomsky states:

The idiosyncratic character of the relation between

the derived nominal and the associated verb has been so often remarked that discussion is superfluous. Consider, for example, such nominals as laughter, marriage, construction, actions, activities, revolution, belief, doubt, conversion, permutation, trial, residence, qualifications, specifications, and so on, with their individual ranges of meaning and varied semantic relations to the base forms. There are a few subregularities that have frequently been noted, but the range of variation and its rather accidental character are typical of lexical structure. (1972:19)

A similar position is taken by Gruber, who defines productivity as follows:

By productive we shall mean complete productivity; that is, a process of word extension will be called productive only if it is possible to define by their lexical environment that set of words to which that process applies, in such a way that every word that falls within this definition is subject to this process. That is, for every word satisfying this definition, it is part of the speaker's competence that a new word exists, derived from the given word by this process [...]. On the other hand, by a nonproductive process we shall mean one for which the words to which it applies can not be defined by purely semantic and/or syntactic means, regardless of how large this class is. (1967:107)

To illustrate his notion of a nonproductive process, Gruber goes on:

[...] the words bag and sack can be used as nouns and as verbs. There is apparently a process whereby a noun X can come to be used as a verb approximately meaning 'to put something in X'. But while this seems to be a real process, it cannot be said to be productive in the sense defined above, because we cannot take the word pouch, having a similar meaning to bag, and derive the verb to pouch as in he pouches his sand. At any rate, the sentence is decidedly different in acceptability from the sentence he bagged his sand.

[...] It is part of the competence of a speaker of English at the present state of the language that bag is a verb but pouch is not. If pouch should ever be usable as a verb then there would be a change of his knowledge of the language; that is, the speaker's competence would have changed. (1967:107)

Thus, there has been quite general agreement as to the definition of productivity and its role in syntactic processes.

But there are additional considerations which bear on both the accuracy of these observations as well as their relevance to a meaningful definition of productivity. Among these con-

considerations are the following. First, in the case of transitive verb expressions (to which I will restrict my attention) there are restrictions that hold between verb and direct object for all verbs - not just for those derived from nouns. A second consideration is creativity in the area of such derived formations. Third, in an important sense, the possible relationships between nouns and verbs derived from them in English are highly constrained. And, furthermore, the constraints are precisely the same in as unrelated a language as Indonesian. Finally, there are obvious relationships among the possible relationships. All of this, taken together, smacks of something highly systematic.

Concerning the first point, verb/object restrictions, while it is clearly true, as Gruber says, that "...we cannot take the word pouch, ... and derive the verb to pouch as in he pouched his sand", and to be sure, the acceptability of he bagged his sand is considerably higher, this observation is altogether meaningless, it seems to me, in view of the fact that the vast majority of transitive verbs occur with a restricted set of objects. Consider for example, the relative acceptability of the sentences listed as set (1):

- (1) (a) He bagged his sand.
- (b) He pouched his sand.
- (c) He boxed his sand.
- (d) He canned his sand.
- (e) He shelved his sand.
- (f) He treed his sand.

Next, compare them with the sentences of (2):

- (2) (a) He bagged his tobacco.
- (b) He pouched his tobacco.
- (c) He boxed his tobacco.
- (d) He canned his tobacco.
- (e) He shelved his tobacco.
- (f) He treed his tobacco.

With a different object noun, there is a considerable change in the acceptability of the noun based verbs. This contextual determination of acceptability is further illustrated in (3):

- (3) (a) He bagged his sand.
- (b) He pouched his tobacco.
- (c) He boxed his gifts.
- (d) He canned his tomatoes.
- (e) He shelved his books.
- (f) He treed his cat.

Some of these restrictions are quite narrow, as in the case of the verb tree, which admits as object but a few animals (cats, possums, bears, etc.) that characteristically climb trees to escape danger (compare: \*He treed the hippopotamus, whale, dog, worm, etc.).

Gruber's error, it seems to me, is in assuming that because bag and pouch are similar in meaning they should form equivalent derived verbs. In fact, the two nouns are far from equivalent - especially with regard to what each is an appropriate container for. But the fact that pouches are not appropriately employed as containers for sand has nothing whatever to do with systematic English verb formation. Negative evidence of this sort could likely be used to show that there are no verbs at all in English. Consider for example, \*He plucked a moon; \*He washed an ocean; etc.

It is important to note that I am not merely suggesting

that He pouched his sand is strictly grammatical, but predictably lower in acceptability owing to some selectional restriction. Rather, I maintain that English pouch is altogether equivalent to bag with respect to any derivational potential that can conceivably be systematically characterized in a lexical entry. That is, I hold that pouch may be used as a verb quite properly in a sentence such as: My tobacconist pouches his own tobacco. Unless we are willing to subcategorize these verbs according to object nouns which name their possible - or even more specifically, their appropriate - contents, it seems to me that we must allow that they are structurally identical. I would suggest that the expression pouch the tobacco is the derivational parallel of the now proverbial sentence: Birds fly. The considerations, in each case, which reduce probability of occurrence nearly to zero, have nothing to do with any systematic aspect of the linguistic competence of speakers of English. To a very large degree, then, potentially derivable formations deserve a place in grammar essentially like that of infinitely many sentences which have never occurred and probably never will. In short, the question of productivity may be regarded as a special case of creativity in language - to which I will return below.

Returning now to Bloomfield's examples, we can see that there are generalizations to be made in his admittedly diverse list. For example, in the expressions milk a cow, skin a cat, fish a stream, the noun based verbs express the notion of removal of the nouns (milk, skin, and fish) from the object nouns (cow, cat, and stream). A different, but also quite uniform relationship holds in the examples tree a cat, table a motion, bottle the beer; namely, CAUSE the direct object to BE LOCATED (in, on, or at) the place expressed by the verb base. What I am suggesting, then, is that despite the seemingly diverse relationships between nouns and verbs derived from them, it is possible to factor out, so to speak, highly regular underlying relationships.

This procedure will leave a great deal unsaid about the appropriate reading of the verb in relation to the noun. However, I am inclined to believe that what remains after the factoring out process will turn out to be just that portion of lexical relationships which is linguistically unstructured. I would maintain, then, that an expression such as table the motion is structurally equivalent to one such as tree the cat. The fact that laying a piece of paper on a table has come to have a symbolic import of its own in western culture does not in any way detract from the essential structural identity of these expressions.

This point can be clarified somewhat in connection with another noun-verb relationship. The verbs in question appear to be based on a simile involving the homophonous noun. For example, consider the expressions ape someone's gestures, dog someone's footsteps, mother a husband. These expressions may be informally characterized by the formula: DO AS THE NOUN MENTIONED IN THE VERB BASE (ape, dog, mother) DOES, or BE (LIKE) THE NOUN MENTIONED IN THE VERB BASE TO THE DIRECT OBJECT.<sup>1</sup> What these characterizations of the relationship fail to include is the semantically most relevant information as to just what apes, dogs, mothers, etc. are like. In fact, of course, they are like a great many things, and the question of how particular characteristics such as mimicking, following people, and doting on people become associated with apes, dogs, and mothers, respectively, is of considerable interest in itself. However, these are not structural considerations.

Beneath these unstructured metaphorical extensions, it is possible to distinguish a small set of regular relationships

- one of which occurs in every instance of a homophonous denominal verb in English. These relationships, with examples, are listed in (4):

- (4) (a) CAUSE vb GO TO object  
 i. water the lawn  
 ii. air the room
- (b) CAUSE vb COME FROM object  
 i. peel an orange  
 ii. bone a chicken
- (c) CAUSE object BE + LOC. vb<sup>2</sup>  
 i. crate books  
 ii. pocket a pen
- (d) BE (LIKE) vb TO object<sup>3</sup>  
 i. father a child  
 ii. mother a child

Clearly, these four relationships are quite distinct; and one might well expect one or more of them to be uniquely marked in a language such as Indonesian, where extensive use is made of morphological derivation. In fact, however, this is not the case. In Indonesian, essentially the same relationships found in the examples of English class transfer may be found to hold between verbal derivatives suffixed with -i and nominal bases from which they are derived. Thus, beside English water the lawn, we find in Indonesian the corresponding examples listed under (5a) (the meN-prefix has no bearing on the question at hand):<sup>4</sup>

(5) (a)	Noun	Verb
i.	<u>air</u> 'water'	<u>mengairi sawah</u> 'irrigate a field'
ii.	<u>gambar</u> 'picture'	<u>menggambari majalah</u> 'illustrate a magazine'
iii.	<u>dinding</u> 'wall'	<u>mendingingi kebun</u> 'wall (in) a garden'

In the opposite sense (i. e. REMOVE VERSUS APPLY) of English skin a cat we find in Indonesian the examples listed under (5b):

(5) (b)	Noun	Verb
i.	<u>perut</u> 'stomach'	<u>memeruti ayam</u> 'gut a chicken'
ii.	<u>sisik</u> 'scale(of fish)'	<u>menjisiki ikan</u> 'scale a fish'
iii.	<u>bulu</u> 'feather'	<u>membului ayam</u> 'pluck a chicken'

There are several rather remarkable facts about this latter group of forms in Indonesian and English. First, in both languages the process appears to be quite limited, and the number of verbs in each case which bear this relationship to nouns is quite small (hardly more than a few dozen in either language). What is perhaps more remarkable is that to a very large extent the same lexical items are involved in both languages. In general, the process appears to be involved in making various kinds of food fit for human consumption. Thus, we find the skinning, gutting, scaling, de-feathering, boning, etc. of animals, and the peeling, pitting, etc. of fruits. The range of activities expressed in this way is somewhat broader in Indonesian than it is in English.

Thus, such matters of personal hygiene as mengutui 'de-louse' (kutu 'louse') and mendjangguti 'pull out beard hairs' (djanggut 'beard') are included.

It is also interesting to note that a certain amount of ambiguity arises out of these circumstances in Indonesian - much more so than is the case in English.<sup>5</sup> For example, from the noun batu 'stone', is formed the verb(s) appearing in the ambiguous sentence (6):

- (6) Ibu membatui beras.

Which may be paraphrased as either (1) 'Mother put stones in the rice' (a not altogether uncommon practice among those who sell rice by weight) or (2) 'Mother removed stones from the rice' (assuming she had bought rice adulterated in this fashion). A similar ambiguity occurs between the sentences in (7):

- (7) (a) Ibu menguliti djeruk. 'Mother peeled a djeruk [a kind of citrus fruit].'  
 (b) Ibu menguliti buku. 'Mother put a cover on a book.'

where the verbs have the noun kulit 'cover, (skin, peel, bark, leather)' as a source. Notice also that the range of meaning variation for the English denominal verbs in (4a-d) corresponds exactly to the range of the Indonesian examples in (5a and b), augmented by the following examples (5c and d) corresponding to (4c and d):

(5) (c)	CAUSE object	BE + LOC. vb
	Noun	Verb
i.	<u>kotak</u> 'box'	<u>mengotaki buku</u> 'crate books'
ii.	<u>kantung</u> 'pocket'	<u>mengantungi pena</u> 'pocket a pen'
(d)	BE (LIKE) vb	TO object
i.	<u>ajah</u> 'father'	<u>mengajahi anak</u> 'be like a father to a child'
ii.	<u>guru</u> 'teacher'	<u>menggurui teman</u> 'lecture (in the non-literal sense of assuming a condescending manner) a friend'

Considering the enormous number of such verbs which are identically marked (or unmarked, as in English) the fact that such formations are readily intelligible (within severely constrained limits of ambiguity) is surely not accidental. It appears that there are interpretive principles that language users apply; and these principles appear, furthermore, to be not altogether language specific. Thus, it seems to me inconceivable that a view such as Bloomfield's could be wholly correct.

Furthermore, creativity in this area strongly suggests that the limitations on productivity may be far more rational than many have supposed. The fact is that new formations of this sort are used and accurately interpreted in the sense intended quite commonly. Some further examples (from recent newspaper articles) are: garage the car; sidewalk the merchandise; picture the walls (with nudes); curb and gutter the street. In such cases, it is not at all clear how a lexical entry could have been supplied ahead of time. For me, at least, these were novel expressions which, however, I

correctly interpreted without difficulty. The point here is that, quite aside from poetic usage, there is an enormous potential for creativity in this area. If I invent, for example, the expression yard the house-plants (for the summer), I doubt that the intended meaning — 'put the house-plants in the yard' would escape many speakers of English.

Examples of this sort can be multiplied many times over for a great many nouns in English — many of which have never, and possibly never will serve as the basis for a morphologically identical transitive verb. However, it seems to me an important part of an English speaker's competence to be able to produce (and interpret in the sense intended) such unlikely verb formations. It therefore would seem appropriate to investigate the factors which make this competence possible.

One obvious explanation for the general interpretability of innovations is that the alternatives are severely limited. That is, a given derived formation might be two ways, or seven ways, or conceivably a hundred ways ambiguous. The problem of accounting for particular readings is simply not formulable without some such principle as this. More importantly, as I have indicated above, this theoretical imperative is supported by a good deal of empirical evidence in English and Indonesian.

Consider now the relative simplicity and generality of the relationships expressed derivationally — involving as they characteristically do such components of meaning as CAUSATIVE, INCHOATIVE, LOCATIVE, MOTIONAL, etc. To come at it negatively, we would not expect to find regularly derived denominal verbs in any language which have the meaning 'grasp NOUN in the left hand and shake vigorously while standing on the right foot in a 2½ gallon galvanized pail of corn-meal-mush'. Furthermore, as I have demonstrated above, both the specific combinations of the former, recurring features, as well as their association with particular lexical items is essentially alike in two languages as genetically unrelated as English and Indonesian.

That is not to say, of course, that a given semantic relationship is uniformly marked by a single morphological process. Indeed, such relationships are commonly manifested by a variety of morphological (and even lexical) means. Furthermore, particular derivational morphemes tend to represent a variety of relationships. In the former case, for example, in English, comparatives of adjectives are taken to reflect a single relationship whether manifested by the bound morpheme — er or the free form more. In short, there is a single relationship, COMPARATIVE, which may be marked in quite distinct manners for different lexical items.

Essentially the same observations may be made with regard to noun based verbs in English and Indonesian. To show that the English zero-derivation is not peculiar in this respect, let us consider a few verbs which are formed by means of the suffix -ize (8):

- (8) (a) hospitalize  
 (b) rubberize  
 (c) ionize  
 (d) winterize

Notice, in particular, that the meaning relationship between the associated noun and the verb in each case is quite different. That is, hospitalize means 'cause to be in a hospital', ionize means 'make into ions', etc.

In the complementary situation, we find that a single

relationship may be quite differently marked from one lexical item to another. For example, it seems to me that the nouns and verbal expressions in the following list (9) are related in essentially the same way, namely CAUSE object BE LOC. vb:

(9)	Noun	Verb
(a)	hospital	hospitalize (the cripple)
(b)	house/haws/	house/hawz/(the troops)
(c)	tree	tree (the cat)
(d)	prison	imprison (the gangster)
(e)	wall	wall in (the garden)

Thus, while it may be unpredictable which morpheme will occur in a given case to express a given relationship, given a noun and a particular relationship of the systematic sort I have been discussing, it is predictable that some means is available to express that relationship. What is significant is that both English and Indonesian take the trouble to mark the relationships in question.

These facts suggest that the theoretically interesting generalizations must concern the relationships themselves, rather than the language-particular (and then highly irregular) representation of these relationships. In fact, there is reason to believe that a system of features may be involved in derivational relationships which are roughly analogous to phonological distinctive features. More exactly, the semantic relationships themselves, complex as they appear, exhibit many of the characteristics of phonological distinctive features.

Consider first the claim of universality for phonological distinctive features. As I have already shown, there is a quite general agreement between the meaning relationships systematically expressed for noun-verb pairs in Indonesian and English. Furthermore, I think we may be certain that the corn-mealmush example will not be systematically represented in any presently unknown language — nor emerge as a new relationship in a language already known. That is not to say, of course, that all of the meaning relationships which are systematically marked in Indonesian will be marked in English as well — or vice versa. At the same time, as we have seen in the relationships between nouns and verbs in both languages, there is a substantial area of overlap. There is no a priori reason why this should be so unless we assume that there are universal constraints which delimit a range of possible relationships in human language. As in the case of universal phonological features, the precise catalogue of universal relationships is entirely an empirical matter; furthermore, no language could be expected to make use of the full set. For that matter, no language can be presumed to employ morphological processes to express such relationships at all. It is altogether possible of course to represent quite simple meaning relationships by means of altogether unrelated morphemes. In English, for example, we have such pairs as come : go; buy : sell; give : take; marry : divorce; up : down; yes : no, etc., which intuitively strike us as being related according to a relatively simple principle of contrariness, but which involve no morphological element (though English has several) to mark the obvious relationship.

What I am proposing, then, is that there is a finite set of relationships in human language which is relevant to morphological (and perhaps lexical) processes. Not all (or necessarily any) members of this set are systematically marked in any given language; and, in fact, to judge from the inconsistencies of English and Indonesian, it appears that morphological processes are far from systematic representations

of such semantic relationships. However, given a lexical base with a particular meaning and a formation derived from it by means of some morphological element, I would maintain that at least one substantial component of the difference in meaning will be of the highly general sort which I have been discussing. If this is so, then it is suggested that these systematic meaning relationships might appropriately appear as (at least) potentially relevant in all lexical entries, just as in the case of phonological features in phonological representations.<sup>6</sup> That is, a matrix — where columns represent morphological processes and rows represent the finite set of systematic relationships — might be viewed as an account of derivational potential for each individual lexical entry rather than merely a statement of systematic potential. Obviously, to associate the full range of systematic semantic relationships with individual lexical entries is far too broad a generalization to coincide with reality. However, aside from the fact that such a move is not unheard of in the literature,<sup>7</sup> it seems the only way to allow for the full range of innovations which occur regularly. In other words, beyond associating some relationship with some morphological element, it is asserted that there exists a finite set of such relationships which are subject to systematic marking (by whatever devices) in any language. This move allows us to account for the fact that corn-meal-mush derivations do not — and cannot — occur in a manner quite parallel to the exclusion of, say, nose-blowing as a possible phonological realization.

If this view is adopted — that there is a primitive set of relationships which are expressible, in principle, for any lexical entry — then the problems of relational variation and productivity assume a rather different character. That is, the problem is to exclude what cannot occur, and furthermore to distinguish between what does and what might occur. Thus, once again, relational variation and limits on productivity in derivational processes may be seen to parallel an important distinction in phonology. In English the latter involves such phonological sequences as: /brik/, /drik/, and /ftik/, where the three are distinguished as possible and occurring, possible but (accidentally) non-occurring, and impossible, respectively. In the case of derived formations, there will be some intersections of columns (representing morphological elements) and rows (representing semantic relationships) which are positively marked. Such markings reflect the observed set of derived formations at the present state of the language just as the appearance of /brik/ in the lexicon of English reflects the synchronic fact that such a sequence does in fact occur.

The empty squares in the matrix, on the other hand, represent the unconstrained derivational potential of the language — corresponding to the /drik/ circumstances in phonology. That is, the absence of any positive specification at, say, the CAUSE vb GO TO object row in the entry for an English noun would indicate that while no verbal derivation bearing that relationship to the noun entry has yet been observed, there is no reason in principle why it could not appear.

Parallel to the need to exclude /ftik/ or /bnik/ as possible phonological sequences in English, there is the need to exclude semantic relationships of the corn-meal-mush sort presented above. In the case of semantic relationships this is accomplished simply by means of excluding such a relationship from the inventory of possible ones.

In this formulation there is little more to be said about either the positively marked intersections of columns and rows (= phonological /brik/) of the inconceivable intersec-

tions (= phonological /ftik/). A number of problems arise, however, in connections which the potential (though unattested) derivations (= phonological /drik/). These problems appear to fall into two rather distinct categories: (1) those which bear on the morphological representation of potential relationships, and (2) those which concern the determination of readings for particular innovations.

With regard to the morphological representation of potential derivations, it is clear that the concessions I have made to creativity do not correspond very well with reality. For example, the proposed format for lexical entries suggests not only that a particular semantic relationship is, in principle, expressible for a given lexical entry, but also (and incorrectly) that it may be expressed by means of any of a great number of morphological elements. Obviously, this is far from the truth; and it is clearly necessary to account for the fact that even in innovation, the possible morphological representations of a potential semantic relationship for a given lexical item are highly restricted. In fact, it is generally the case that a single morphological element is uniquely associated with the semantic relationship to be expressed for a given lexical item. Furthermore, as noted earlier, quite different morphemes may occur as the representation for the same relationship in connection with different entries. For example, beside the recent innovation hospitalize (CAUSE object BE + LOC. vb), there is the semantically equivalent innovation: garage the car, in which the same relationship is expressed by quite different morphological means. Clearly, we cannot say \*hospital-Ø the casualties or \*garage-ize the car to express the same meanings. Somehow we know not only that the processes involving -ize and Ø are appropriate to hospital and garage, respectively, in order to express the same relationship, but we know that no other morphological element is appropriate in these cases.

This latter observation leads to an obvious, though important generalization. That is, by and large, only one morphological element will be used to express a given semantic relationship. This generalization suggests a convention by which all remaining squares in a row are eliminated as potential representations as soon as one square is positively marked.

Such a convention is clearly required in the case of positively marked squares, where it accurately prohibits such a verbal formation as hospital-Ø as a potential representation of the CAUSATIVE-LOCATIVE relationship. With regard to potential derivations, this convention also appears to be an accurate statement of fact — as far as it goes. That is, aside from the complex problem of specifying the appropriate morphological element in particular cases, it is generally the case that a single such element will be consistently selected. For example, though there are analogous formations for each in the expression of CAUSATIVE-LOCATIVE, the morphological elements: -ize and en- are clearly inappropriate for the lexical items: garage, yard, or sidewalk. Regardless of any dispute that might arise as to the acceptability of these nouns as verbs, it is absolutely certain that -ize and en- cannot be employed in the sense intended. Even in innovation, then, the convention of one and only one morphological representation is required.

Let us now turn to the question of how we know which morphological element is appropriate in particular cases. The answer to this question, it appears, is far from simple; and it is not even certain that all such determinations are made on a principled basis. However, it is possible to discern certain constraints at work in this area. For example,

in a study of affixial negation, Zimmer (1964 : 84) has observed a 'restriction against the use of un- (in English) with adjectives that have obvious simple antonyms' (e. g. there are no derived negatives: \*ungood, \*unlong, \*unfat, etc. owing to the presence in the lexicon of the corresponding morphemes: bad, short, thin, etc.).<sup>8</sup> This characteristic of pre-emption is strikingly similar to the one and only one convention proposed above, and surely must be regarded as an important principle in any account of the limits on derivational productivity. In terms of the denominal verbs under discussion, we might postulate that the absence of an English verb feather meaning 'remove feathers from (object)' is, similarly, a consequence of the presence of the verb pluck in the lexicon of English. (Recall that an equivalent formation in -i, based on the noun bulu 'feather' occurs quite regularly in Indonesian.)

While I am not prepared to give a full account of constraints on derivational potential in terms of such pre-emption, I should like to suggest that the same principle is involved in the non-unique morphological representation of a single derivational relationship. That is, a morphological process may be pre-empted not only by a simple lexical equivalent, but by some other morphological process as well. In the terms of Zimmer's discussion, for instance, we might say that the absence of \*untypical (owing to atypical) is directly parallel to the absence of \*ungood (owing to bad). Now there are at least two ways to account for \*untypical. First, we might simply list atypical in the lexicon so that it would pre-empt \*untypical as bad does \*ungood. If this view is adopted, however, we are forced to abandon Zimmer's condition regarding 'simplex antonyms'; for it is highly doubtful that a native speaker of English exists who both uses the term atypical and fails to recognize its structural complexity.

What seems to me more reasonable is to recognize that there is a range of distinctions between lexical and derivational representation. That is, on the one hand, there are distinctions such as good : bad (purely lexical), while on the other, there are distinctions such as good : not good, bad : not bad (purely synthetic, or derived in structure); but more importantly, the area between these distinctions is not at all clear cut. At least, while it may be possible to distinguish purely lexical representations of certain relationships from derivational ones, there is clearly a broad range of possible derivational representations of a given relationship.

It appears, in fact, that some sort of hierarchy of priorities plays a significant role in the selection of particular morphological elements, in which hierarchy, purely lexical alternatives appear to have the highest priority. At the other end of the scale are the most highly productive processes of the language. In between, there appear to be a variety of determinants which bear on the precise morphological representation of particular derivational relationships, of which the following are but a sampling.

Consider first, the negative atypical discussed above. Considering the proposal by Chomsky & Halle that certain English lexical bases be marked of foreign origin, it is altogether reasonable that the entry for typical should be marked [+ Greek origin]. Furthermore, since it is clearly the case that a-/an- negatives are of Greek origin, it is only necessary to order the morphological rules for negation in such a way as to attach the prefix a-/ to typical before the more general un- rule applies — exactly parallel to the attachment of /-θ/ to sheep before the more general sibilant plural rule applies in English. In conjunction with the

one and only one convention, then, we not only specify atypical, but we exclude \*untypical.

Similar constraints, though of a phonological nature, appear to hold for derived verbs in -ize, where the final of the base form cannot be a peripheral stop.<sup>9</sup> Furthermore, an appropriate base is polysyllabic, and the final syllable is unstressed. Thus, while the relationships expressed are quite various, in the following examples (10) the phonological constraints are met:

- (10) (a) hospitalize  
(b) finalize  
(c) winterize  
(d) brutalize  
(e) rubberize  
(f) ionize  
(g) sensitize  
(h) subsidize

Thus, it is possible to predict that verbs expressing particular semantic relationships to nouns and adjectives will occur with the suffix -ize only if their lexical bases exhibit some rather particular phonological characteristics. Moreover, I should like to suggest that in the hierarchy of priorities, any lexical base meeting the relevant requirements is more likely to represent any of several verbal relationships in this way.

The foregoing considerations provide some evidence that the limits of productivity may not be so obscure a matter as has generally been supposed. I should like now to turn to some further considerations which seem to me highly relevant to determinations of productivity and relational variation, but which have been largely ignored in the literature.

Consider first, Zimmer's generalization to the effect that

negative affixes are not used (in English) with adjectival stems that have 'negative' value on evaluative scales such as 'good-bad,' 'desirable-undesirable,' [...] (1964 : 15).

This is an important claim with regard to productivity, since it would reduce by half the potential derivations which pair off in the manner of happy : sad. Thus, there are few derived negatives of the sort (11):

- (11) (a) bored \*unbored  
(b) sick \*unsick  
(c) tired \*untired  
(d) naked \*unnaked

Even in cases where the principle of lexical pre-emption seems to fail, this semantic constraint appears to hold — as in: true-untrue : false-\*unfalse; happy-unhappy : sad-\*unsad.

Consider now the two Indonesian sentences (12) whose morphologically identical verbs are based on the nouns kantung 'pocket' and air 'water', respectively:

- (12) (a) Dia mengantungi péna. 'He pocketed the pen.'  
(b) Dia mengairi tanah. 'He watered the land.'

Notice first that in each case, the same semantic relationship is involved in the correct interpretation — namely, some object (e. g. péna 'pen') or substance (e. g. air 'water') moves (in) to (or comes to be located at, in, on) some location (represented by kantung 'pocket' and tanah 'land', respectively). However, while in (12a) it is the object named by the direct

object péna which moves, in (12b) it is the substance named by the verbal base air. Thus, an apparent semantic regularity in these, and many similar cases, does not correspond to a syntactic one. That is, the semantic regularity cannot be represented by any simple rule involving such categories as NOUN, TRANSITIVE VERB, DIRECT OBJECT, etc. The generalization to be made is quite simply that the semantic relationship between such noun-based verbs and their direct objects involves the movement of (or the becoming located of) the movable noun to (or in, at, on, etc.) the stationary noun, regardless of whether (movable/stationary) are characteristics of the verbal base or of the direct object.<sup>10</sup>

This observation suggests that movability may be an important property of certain lexical items. Thus, in the examples (12) we might suppose that the lexical entries for péna 'pen' and air 'water' contain a feature [+movable] while those for kantung 'pocket' and tanah 'land' are negatively marked in this regard. Unfortunately, however, there are numerous examples in both English and Indonesian which indicate that any such definite lexical specification is misguided. That is, in expressions such as (13):

- (13) (a) deck the ship  
 (b) deck the opponent

the examples (a) and (b) are interpretable in the intended sense only if the underscored form is [+movable] in (a) and [-movable] in (b). Clearly, the feature [+movable] is not an absolute, but a relative one: pens are more movable than pockets; water more movable than land, etc.

Nor do such judgmental considerations appear to be restricted to this one interpretive situation. In fact, yet more subtle distinctions appear to be crucial in the cases of APPLY and REMOVE interpretations. For example, recall the pair of Indonesian sentences in (7) where the verbal interpretations REMOVE kulit and APPLY kulit appear in (a) and (b) respectively. The question arises, in such cases, as to the criteria which are responsible for the unique — though quite opposite interpretations in these pairs of expressions. It appears, in part, that the REMOVE readings are available only when one of the nouns appearing in the relationship VERB BASE : DIRECT OBJECT is assumed to be a constituent part of the other noun involved. Indeed, in examples such as bone the fish, skin the cat, pit the cherry, etc., this seems to be an accurate observation. However, considering the ambiguity of the Indonesian expression noted earlier — membatui beras (batu 'stone') meaning both (a) 'put stones in the rice' and (b) 'remove stones from the rice' it is difficult once again to conceive of a definite lexical feature specification for batu 'stone' capable of predicting just these readings.

Furthermore, conceptual details of the REMOVE reading suggest that relative ENHANCEMENT of the nouns mentioned in the verb base and direct object may play some role in productivity. In cases such as milk the cow and fish the stream it is the noun of the verb base that is profitably extracted from the object noun, while expressions like peel the orange and bone the fish exhibit just the opposite relationship. Once again, Indonesian provides precisely parallel examples as can be seen in (14a and b) respectively:

- |      |                       |   |
|------|-----------------------|---|
| (14) | Noun                  | Verb  |
| (a)  | <u>sagu</u> 'a fruit' | <u>menjagui enau</u> 'remove sagu from the enau (a kind of palm |

- |     |                     |   |
|-----|---------------------|---|
| (b) | <u>sabut</u> 'husk' | <u>menyabuti kelapa</u><br>'husk a coconut' |
|-----|---------------------|---|

Thus it appears that appropriate noun bases for such verbs must either be very desirable or very undesirable in relation to their direct objects. But while such a discrimination seems to be altogether within the competence of language users, an explicit account is clearly beyond the means of current syntactic and/or semantic formalism.

These observations suggest to me that a great many factors which bear on derivational phenomena and on productivity and relational variation in particular have been overlooked — even in the open-ended lexical representation I have proposed. This does not alter my conviction that derivational relationships are essentially regular, and that the appropriate area of investigation concerns the systematic constraints on otherwise quite general patterns of derivational potential. However, it is clear that at least some features relevant to derivational potential and relational variation cannot be determined ahead of time for a great many lexical entries. The absence of a formalism to capture such obviously related variables is an enormous obstacle to an economical (and accurate) lexical representation.

In conclusion, it seems to me that problems of relational variation and limited productivity have generally been approached from the wrong direction. In particular, the potential for creativity in the area of derivational morphology calls for an explanation on a par with that which has long been recognized as necessary — both for accidental gaps in phonology as well as for the infinite number of grammatical sentences of any language which, by chance, happen not to occur in any corpus. This observation has led me to assume that there must be some quite general principles which govern potential innovations in the domain of derivational morphology. Accordingly, I have proposed that the appropriate task is not only to account for derived formations which presently occur, but must include an account of the precise range of new formations which might occur. In this regard, I have shown that there are generalizations to be made which serve to constrain derivational potential; and I have suggested that certain judgmental variables play an important role in this domain.

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#### FOOTNOTES

1. The optionality provided for LIKE takes account of the distinction between literal and non-literal respectively in the expressions (a) father a child; (b) mother a child. Quite the opposite is true of the Indonesian expression: mengajahi anak, which is based on ajah 'father' and unambiguously means 'be like a father to a child'.

2. The relationship expressed in (4c), while it is accurate as far as it goes, can be subcategorized to represent the stative/motional dichotomy seen in the expressions: (a) bag the groceries; (b) cart the groceries. This distinction is further motivated by the ambiguity of expressions like tree the cat, which can mean either 'cause the cat to BE LOCATED IN the tree' or 'cause the cat to GO INTO the tree'. The equivalent ambiguity arises in Indonesian as well.

3. I have recently noticed one example which appears to share some of the characteristics of (4d), but which is beyond this analysis. In the expression baby someone, while

the simile is involved, it is associated with the direct object rather than the subject of the verb. To my knowledge, the example is unique in this regard.

4. For additional Indonesian examples in each category, see Rose (1969, Appendix). Indonesian examples are cited throughout in the highly consistent standard orthography of Bahasa Indonesia, in which only the following conventions require mention: j = /y/, tj = /č/, dj = /j/, nj = /ñ/, ng = /ŋ/, e = /ə/, and é = /e/ (The symbol é is an unorthographic representation of the ambiguous phonemic value of the symbol e).

On August 17, 1972, a spelling reform proposal was officially adopted by the Indonesian government, comprising half a dozen changes with the older spelling as input and based on phonological principles. However, since no dictionaries exist in the revised spelling, the older orthography is used throughout.

5. But notice English dust the furniture 'remove dust' beside dust the crops 'apply dust'.

6. Jackendoff (1966) has proposed a similar scheme as an account of systemic potential.

7. Chomsky (1965 : 187) has suggested: 'Perhaps one must regard the gaps as accidental, at least in some such cases, and allow for nonoccurring as well as actual cases.'

8. Marchand (1966) cites true : untrue : false as a rare exception to this generalization.

9. It appears that the constraint is much narrower if a few Greek roots are excepted. There are but a handful of non-coronal finals such as those that appear in sympathize, philosophize, and syllabize — all of which are of greek origin. Syllabize, an exception to my constraint, is a dictionary discovery for me. I use — and have seen used — only syllabify.

10. In Indonesian, these relationships are a part of a more complex system of morphological derivation. That is, for example, many derived verbs in -i are not based on nouns (e.g. menaiki tiang 'climb a pole' based on naik 'rise'). Furthermore, corresponding to the formations in -i, there is typically a transitive formation in -kan which bears quite a different relationship to subject and direct object. The several distinctions are beyond the scope of the present discussion; but it may be noted that for certain -i and -kan verbs derived from the same basic form, what is named by the direct object is conceived of as stationary in the case of -i verbs and as moving in the case of -kan verbs.

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#### ON CONSTRAINING THE PRODUCTION OF DENOMINAL VERBS

In a recent article (Rose, 1973), James Rose claims that the production of denominal verbs in English is quite lawfully constrained, in contrast to the view expressed earlier by Bloomfield (1933) and others. Rose makes the following strong proposal:

[...] it is possible to distinguish a small set of regular relationships — one of which occurs in every instance of a homophonous denominal verb in English. These relationships, with examples, are listed in (4):

- (4) (a) CAUSE vb GO TO object  
 i. water the lawn  
 ii. air the room  
 (b) CAUSE vb COME FROM object  
 i. peel an orange  
 ii. bone a chicken  
 (c) CAUSE object BE + LOC. vb  
 i. crate books  
 ii. pocket a pen  
 (d) BE (LIKE) vb TO object  
 i. father a child  
 ii. mother a child

Rose support this claim with data from English, and, in addition, he shows that instances of these same denominal types occur in Indonesian.

One need not look far, however, to find a number of denominals in both English and Indonesian which do not belong to any of the four classes that Rose permits. In many cases, these denominals can be grouped into well-defined classes similar to Rose's. Below I list four of these additional types, with examples from English:

- (1) (a) COMMUNICATE TO object BY MEANS OF vb  
 i. telephone the President  
 ii. wire Grandmother  
 iii. cable Tom  
 iv. radio the crew