3: Productivity

We turn in this chapter to a discussion of the notion of *productivity*. The turning will seem abrupt to some, for up to this point the matter has hardly been mentioned. Yet productivity is one of the central mysteries of derivational morphology. It is the root of the strange and persistent fact that, though many things are possible in morphology, some are more possible than others.

The term *productivity* is widely used in studies of derivational morphology, and there is obviously some intuition behind the usage, but most of the discussion of it is rather vague. Indeed, mere mention of the subject seems to be taken by many as an open invitation to anecdotalism. In what is perhaps a reaction to tradition, I have attempted to restrict my own discussion to very specific properties, properties which seem to characteristically distinguish productive from nonproductive WFRs. The discussion will be imbedded in a comparison of the two English nominal affixes *#ness* and *+ity* in one particular morphological environment: when they are attached to adjectives of the form *Xous*. The framework of the analysis will be that of chapter 2. In fact, the entire method of the present chapter presupposes that of the last: much of what will be said simply makes little or no sense in other systems. Therefore, any credit which this discussion of productivity may enjoy must redound to its predecessor. First, however, some preliminaries.

3.1. Preliminaries

It is sometimes claimed that productivity is a matter which never enters into the study of syntax. This is not quite true. Compare the two rules Dative Movement and Passive. Observe, in the case of the former, that the predicates which permit it, while members of a more or less well-defined semantic class, are not all the members of that class, but rather some reasonably arbitrary selection of them. On the other hand, while there are some transitive verbs which do not allow Passive, the exceptions seem to be principled. One would appear to be justified, therefore, in saying that Passive is more productive than Dative Movement.[1] Of course, in syntax there are certain types of operations which are immune to questions of productivity. Such rules as Subject-Auxiliary Inversion, which are not optional in any sense of the term, cannot ever be thought of in terms of productivity. In contrast, WFRs are always optional.

[1] A more detailed discussion of this question is presented in Oehrle (1975).

A first attempt to articulate one's intuitions about the meaning and utility of the term *productivity* in morphology generally identifies productivity with sheer number. If we want to compare the productivity of two WFRs, we may simply make lists of the words formed by the respective processes and add them up. The longer the list, the more productive the WFR. An immediate objection to this method, however, is that it isn't fair: it doesn't take into account the fact that there are morphological restrictions on the sorts of words one may use as the base of certain WFRs. Thus, *#ment* and *+ion* both form nouns from verbs (*detachment*, *inversion*), but the latter is restricted to latinate verbs. There is a simple way to take such restrictions into account: we count up the number of words which we feel *could* occur as the output of a given WFR (which we can do by counting the number of possible bases for the rule), count up the number of actually occurring words formed by that rule, take a ratio of the two, and compare this with the same ratio for another WFR. In fact, by this method we could arrive at a simple index of productivity for every WFR: the ratio of possible to actually listed words.

Two problems face this simple method. The first is not crucial, but often overlooked in more cursory discussions of productivity (not, however, in many traditional accounts). It is simply that one cannot speak absolutely about the productivity of a WFR. Rather, one must ask how productive an affix is when attached to words of a particular morphological class.[2] Thus, compare the two affixes *#ness* and *+ity* when attached to two distinct classes of base adjectives, those ending in *ive* (*perceptive*) and those ending in *ile* (*servile*). The simple list tells us that *#ness* is more productive than *+ity* with the former class of bases (Walker (1936) lists approximately five times the number of words of the form *Xiveness* as those of the form *Xivity*). However, this result does not carry over to the second class of bases. The number of words of the form *Xility* overwhelmingly exceeds that of those of the form *Xileness*. In the one case one affix is more productive, in the other case the other is. Thus, there is no absolute way to say that one WFR is more productive than another. Rather, one must take into account the morphology of the base.[3]

The second problem with the simple mechanical method of computing productivity is that it depends very crucially on the idea that every time we make up a new word, it is entered in a list. Unless all new words are listed, we have no effective procedure for computing the ratio of existing to possible words, even when we restrict ourselves to a particular morphological class of bases, and hence no effective way of computing an index of productivity. With some very productive WFRs, the notion of a list is simply counterintuitive. For example, the adverb-forming suffix *-ly*, which is far and away the most productive WFR in English, occupies some 34 pages in Walker's dictionary, many more than any other affix. But when we glance at this

[2] One modern author who does stress the fact that morphological form affects productivity is Karl Zimmer (1964), especially in his discussion of the productivity of the negative prefix *un#* with bases which are past participles or adjectives of the form *Xable* as opposed to monomorphemic adjectives.

[3] There is still a valid sense of the general productivity of a WFR. A WFR whose general productivity is high will have few morphological restrictions on the class of bases to which it attaches. Thus, *+ity*, while it may be very productive with certain limited morphological classes of adjectives, does not extend its domain to new morphological classes, while *#ness* is fairly free morphologically. The general productivity of *#ness* is therefore higher. But this matter is entirely separate from the one under discussion in this chapter.

list, we feel somehow that it is superfluous. With such a productive rule as this it seems sufficient just to take an adjective–almost any English adjective[4]–and tack on *-ly* to make an adverb.

Later in this chapter I will present some concrete, and I think convincing, evidence that the output of the most productive WFRs does not meet independently established criteria for listing. There are good reasons for not listing all the *-ly* adverbs in English. This means that there is no procedure for computing productivity from mere numbers, but rather that the productivity of a WFR is the result of the interplay of a complex of factors, some of which I have attempted to isolate.

One more point must be made before proceeding: speakers of a language have intuitions about productivity. I will give an example of what I mean by this. Consider again the two suffixes *#ness* and *+ity* attached to bases of the form *Xive*. Take one word out of the class *Xive*, *perceptive*, and form with the suffixes the two words *perceptiveness* and *perceptivity*. Present these two words to native speakers of English and they will almost invariably say that though both words are possible, one of them, *perceptiveness*, sounds "better". *Perceptivity* is said to be "awkward" or "fancy". The same will hold for any other pair of words of the form *Xiveness* and *Xivity*, provided that neither is an already common word. Clearly, speakers are not using lists when they give these answers; rather, they are showing evidence of having direct access to an intuition. This intuition seems to express the notion "likelihood of being a word of the speaker's active vocabulary", a notion equivalent to productivity. Of course we are not interested merely in the existence of the intuition, nor even in how the speaker provides it (that is much too large a task). Rather we would like to explore some of its more objective correlates and the factors which determine it.

3.2. *#ness* and *+ity*

Our method of investigation will be to compare in some detail two WFRs which we know to differ in productivity. In order to isolate productivity, we try to choose rules which come as close as possible to differing only in that dimension, thus removing outside factors which might interfere with our results. We therefore must take two rules which operate on the same base and have outputs of the same lexical category and subcategorization. Such rival pairs are not easy to come by, for morphological restrictions are often arranged so as to preclude them. The most interesting pair is probably *+abl* and *#abl*, which we will discuss in some detail in chapter 6, but the mere justification of the distinction between the two is a long matter, and we will turn instead to that reliable standard example, the pair *#ness* and *+ity*, both of which form abstract nouns from adjectives. One of the largest morphological subclasses of adjectives in which they clash is that of the form *Xous* (*monstrous*), and we will select this as our base.

It is clear that *#ness* attaches more productively to bases of the form *Xous* than does *+ity*: *fabulousness* is much "better" than *fabulosity*, and similarly for other pairs (*dubiousness*/*dubiety*, *dubiosity*). There are even cases where the *+ity* derivative is not merely worse, but

[4] Systematically, *-ly* does not attach to adjectives which themselves end in *-ly* (*silly*/**sillily*). *ly* will also not attach to an adjective which already has an adverb associated with it (*good*/*well*/**goodly*$_{Adv}$).

impossible. *acrimonious/*acrimoniosity*, *euphonious/*euphoniosity*, *famous/*famosity*. There is also the simple list test, which is still a good indicator. Walker (1936) lists fewer *+ity* derivatives than *#ness* derivatives of words of the form *Xous*.

3.2.1. Semantics

An important difference between the two sets is that the semantics of *Xousness* is more *coherent*. We say that a WFR is coherent when the words formed by that rule adhere closely to the meaning assigned to them by the semantic function of the rule. Put another way, a WFR is coherent to the extent that one can predict the meaning of any word formed by that rule.

All nouns of the form *Xousness* have the following three paraphrases:[5]

a. '*the fact that Y is Xous*'
His callousness surprised me. = The fact that he was callous surprised me.

b. '*the extent to which Y is Xous*'
His callousness surprised me. = The extent to which he was callous surprised me.

c. '*the quality or state of being Xous*'
Callousness is not a virtue. = The quality or state of being callous is not a virtue.

Furthermore, nouns of the form *Xousness* do not have other meanings. It is thus possible to predict that any noun of this form will have all and only the meanings paraphrased by (a), (b), and (c). The class is therefore semantically completely coherent.

The semantics of the *+ity* derivatives is not nearly so coherent. Though many have the three readings (a), (b), and (c), some lack one or more of these. There are also sometimes other readings: technical senses, concrete nouns, count nouns. Finally, nouns of this class appear more readily in idiomatic contexts. I will give a number of examples. In each case, (a), (b), or (c) is placed before sentences in which the *+ity* derivative has the appropriate reading. *Other* is prefaced in all instances where the reading is different from the three usual ones.

(1) *Readings of* +ity *Nouns*

(i) *various/variety*
a, b) The variety of the fish in the pond surprised me.
c) Variety is not always pleasing.
other) How many varieties of fish are there in the pond?

(ii) *notorious/notoriety*
a, b) His notoriety appealed to me.
c) Notoriety is not a virtue.
other) All the town's notables and notorieties were there.

(iii) *curious/curiosity*
a, b) His curiosity disturbed me.
c) Curiosity can be dangerous.
other) They admired his dress, but only as a curiosity.

[5] It is not clear that we are dealing with three separate readings rather than one tripartite or ambiguous one. I lean towards the latter, but due to the present state of the art of semantics, and perhaps to my own incompetence, I will leave this very interesting question open.

(iv) *porous/porosity*
a, b) The porosity of the material is uncanny.
c) Porosity is often a highly desired quality.
other) The high porosity (*porousness) of the clay made it unfit for use.

(v) *monstrous/monstrosity*
a, b) The monstrosity of what I had done suddenly dawned upon me.
c) ??Monstrosity is not a pleasant quality.
other) What a monstrosity!

(vi) *continuous/continuity*
a, b) The continuity of one's heritage can be disturbing.
other) This story lacks continuity.
The continuities for next week's episode.

(vii) *discontinuous/discontinuity*
? a) There is a sense of discontinuity, failure to follow through.
other) There are many discontinuities in your story.

We can find striking confirmation of the difference in coherence between *+ity* and *#ness* by comparing the derivatives of negative and positive adjectives. Thus, compare *continuity* and *discontinuity* with their counterparts *continuousness* and *discontinuousness*. The latter differ only to the extent that their bases do, something which can hardly be said of the former. The difference may be expressed proportionally:

(2) *continuous*:*discontinuous* = *continuousness*:*discontinuousness*
continuous:*discontinuous* ≠ *continuity*:*discontinuity*

As far as I can tell, there is a direct link between semantic coherence and productivity. Zimmer (1964) has investigated in some detail the English negative prefixes *un#* and *non#* as well as similar negative affixes in other languages. He has found that where an affix is productive its semantics is, in our terms, coherent: "Where one is dealing with a clearly productive morphological process, a simple statement of the semantic content of the process in question . . . seems to be as much as can or should be expected . . ." (Zimmer (1964, 32)).[6] Another somewhat detailed example is found in chapter 6 of this monograph, where the English suffixes *#abl* and *+abl* are discussed. The former is found to be more productive and more coherent.

If we can accept them, the value judgments of speakers also agree with the linking of productivity and coherence, for speakers will usually say of the "less likely" member of a pair such as *connectiveness/connectivity* that it "should have a special sense". Commonsensically, the correlation is perfectly reasonable: the surer one is of what a word will mean, the more likely one is to use it.

[6] A particularly nice observation of Zimmer's is that there is a correlation of productivity with contrary vs. contradictory negation. When a negation rule is productive, its output is contradictory of the base (*not X*, where *X* is the base), whereas when the rule is less productive, its output is contrary (*no X*, or *opposite to X*). The following pairs are well-known examples of this phenomenon:

non-Christian (contradictory):unchristian (contrary)
nonhuman (contradictory):inhuman (contrary)

3.2.2. Phonology

The two suffixes *#ness* and *+ity* differ in the manner of their attachment. *#ness* attaches with a word boundary, represented by #, while *+ity* attaches with a morpheme boundary, represented by +. These boundaries were introduced into linguistics by Chomsky and Halle. Their actual nature is discussed in chapters 4 and 6, and in Siegel (1974). The net phonological effect of the difference between + and # is that on the phonetic surface the segmental phonology and stress of *Xous* are the same in both *Xous* and *Xousness*, whereas with *+ity* stress shifts to the syllable preceding the affix (*luminous/luminosity*) and this syllable is always lax, due to the effect of the rule of *trisyllabic shortening*[7] (*mendacious/mendacity*). The + boundary suffix thus makes the derived word phonetically further from the base. This fact is not, however, always relevant to questions of productivity.[8]

One curious fact about the phonology of *+ity* is that its attachment sometimes triggers the loss of the *ous* which precedes it: *simultaneous/simultaneity/*simultaneosity*, *voracious/voracity/*voraciosity*. Formally, we may represent the process as *R1*:

R1. (ous *Truncation*)
os → ϕ/___+ity

A rule like this, which deletes the last morpheme of a base before a suffix, is called a rule of *truncation*. (The general phenomenon of truncation is quite common and will be discussed at length in chapter 5.) For example, *+ate* drops regularly before *+ant* (*continue/continuant*, *operate/operant/*operatant*). R1 is unusual, though, in that it does not take place in all the words which meet the conditions for it. Thus we have *various/variety*, but *curious/curiosity*; similarly *sedulous/sedulity*, but *fabulous/fabulosity*. Nor do we find any free variation in individual words: for a given base, R1 will either always or never apply. Neither **curiety* nor **variosity* is ever found.

Odder still is the fact that in the large majority of cases it is impossible to predict from any general property of a word whether it will undergo R1 or not. *Curious* and *various* are very close phonologically, as are *sedulous* and *fabulous*. Thus, the application of R1 is determined by individual words; it is *lexically governed*.

The lexical government of R1 has a great effect on the productivity of *+ity*.[9] Evidence for this assertion is the fact that when R1 is governed not by the individual word but by a more general factor, the number of *+ity* derivatives increases markedly, which is to say that the productivity of *+ity* increases.

[7] This rule basically shortens the vowel of any stressed syllable which is three or more syllables from the end of a word. It is discussed at length in SPE.

[8] There is a sense in which # is stronger than +. The strength of a boundary is reflected in the semantic compositionality of the word formed by its bond. As Shelvador (1974) points out, whenever two words differ solely in the strength of an internal boundary, the one with the stronger boundary is closer to compositionality (*conference/conference*). Boundary strength is discussed below in chapter 6. However, it is not always true that WFRs with weak boundaries are not productive. *+Ation*, for example, is very productive with bases of the form *Xize* (cf. chapter 5).

[9] The more globally minded might take heart at finding that although R1 intrinsically follows *+ity* attachment, its operation affects that of the earlier rule. Note, however, that it is the lexical marking for R1 which is the culprit, rather than R1 itself.

We will compare the *+ity* derivatives of words of the classes *XVcious* (*mendacious*) and *Xulous* (*bibulous*). With the first class of bases the application of R1 is not governed by the individual word but rather by the vowel which precedes *ci*:

(3)	Xacious (mordacious)	Xacity (mordacity)	*Xaciosity (*mordaciosity)
	Xocious (precocious)	Xocity (precocity)	*Xociosity (*precociosity)
	Xecious (specious)	*Xecity (*specity)	Xeciosity (speciosity)

The rule documented in (3) is that if the conditioning vowel is *a* or *o*, then R1 applies, but if the vowel is *e*, then R1 does not apply.[10] All words follow this rule; there are no exceptions. In contrast, the class *Xulous* observes no such general rule:

(4)	nebulous	*nebulity	nebulosity
	credulous	credulity	*credulosity

Since the operation of R1 is lexically governed in *+ity* derivatives of words of the class *Xulous* and is not lexically governed in *+ity* derivatives of words of the class *XVcious*, we expect *+ity* to be more productive with the latter base than with the former. To test this prediction, we will compare the lists in Walker (1936) of the following four classes: *Xacious*, *Xacity*, *Xulous*, *Xulosity/Xulity*. These are given in the following tables:[11]

(5)	bibacious	*	pugnacious	pugnacity
	efficacious	*	pertinacious	pertinacity
	inefficacious	*	minacious	minacity
	perspicacious	perspicacity	capacious	capacity
	pervicacious	pervicacity	rapacious	rapacity
	procacious	procacity	spacious	*
	edacious	edacity	feracious	feracity
	mendacious	mendacity	veracious	veracity
	mordacious	mordacity	gracious	*
	audacious	audacity	voracious	voracity
	sagacious	sagacity	vivacious	vivacity
	fugacious	fugacity	sequacious	*
	salacious	salacity	loquacious	loquacity
	tenacious	tenacity		
	fumacious	*		
	contumacious	*		

[10] Exactly what sort of conditioning factor is at work here is not clear to me. Strictly speaking, it is phonological, but the quality of the vowel in such a position does not strike me as a particularly natural phonological condition for a rule such as R1.

[11] We do not include the classes *Xocious* and *Xecious* and their derivatives since these classes are too small to be of real value.

(6)

fabulous	fabulosity	glandulous	*
sebulous	*	pendulous	*
nebulous	nebulosity	undulous	*
noctambulous	*	nodulous	*
bibulous	*	scrofulous	*
tubulous	*	solidungulous	*
miraculous	*	orgulous	*
craculous	*	cellulous	cellulosity
flocculous	*	ramulous	*
pediculous	*	emulous	*
ridiculous	*	tremulous	*
folliculous	*	cumulous	*
vermiculous	*	granulous	*
ventriculous	*	crapulous	*
meticulous	*	populous	*
calculous	*	scrupulous	scrupulosity
loculous	*	unscrupulous	*
monoculous	*	scaberulous	*
tuberculous	*	querulous	*
flosculous	*	torulous	*
credulous	credulity	garrulous	garrulity
incredulous	incredulity	patulous	*
sedulous	sedulity	edentulous	*
acidulous	*	tortulous	*
rigidulous	*	fistulous	*
stridulous	*	pustulous	*

The data is very clearly in accord with our prediction. There are 29 adjectives of the form *Xacious*. All but 8 of these have corresponding nominals of the form *Xacity*. There are 52 adjectives of the form *Xulous*. Only 8 of these have corresponding nominals. We see that when there is a condition on the application of R1 which is not lexically determined, there are very few gaps in the *+ity* paradigm. On the contrary, where we have no such general condition, we have many gaps and in fact very few actually occurring nominals.

The connection between lexical marking and lack of productivity is not surprising when we look at the matter from a broader, social perspective. A speaker confronted with an adjective of the form *Xacious*, from which he wishes to form a nominal in *+ity*, will know that the nominal must be *Xacity* and will, therefore, not hesitate to use it. When faced, however, with an adjective in *Xulous*, he is in a quandary. Which is correct, *Xulity* or *Xulosity*? He doesn't know, though he does know that one of the forms is correct, that there is no free variation. In order to avoid the stigma of using the wrong word, he simply uses neither and falls back on the trusty *Xness* form, where he knows that though he is surely revealing the paucity of his vocabulary, he cannot make a mistake. Thus, on very general social grounds, we can see a direct

connection between the condition on R1 and the mere use of the form in *+ity*. When the former is more general, the latter is more likely to be used. It should be noted that with *#ness*, which is generally more productive than *+ity*, there is no rule corresponding to R1 and hence no need for any lexical marking at all. It is reasonable to conjecture that this fact in some way contributes to the greater productivity of *#ness*.

3.2.3. Lexical Government and the Lexicon

What does it mean for a rule to be lexically governed? Most importantly, every word which might undergo the lexically governed rule must bear an arbitrary marker, in this case either +R1 or −R1.[12] This means that all such words must be entered in a list to which we can refer. What is this list? The most obvious candidate is the lexicon. The lexicon is conventionally viewed as the repository of all the arbitrary items of a grammar (cf. Chomsky (1965) and Bloomfield (1933)), and within our framework these exceptional items will for the most part be (derivational) words. Let us say that all and *only* those words which are exceptional, i.e. arbitrary in at least one of their various features, will be entered in the lexicon. From this definition it follows that the *+ity* derivatives of most *Xous* adjectives must be entered in the lexicon. It also follows that the *#ness* derivatives, unless they are exceptional in some way which we have yet to discover, *must not* be listed in the lexicon.

It is easy to see how listing in the lexicon can affect semantic coherence. We have assumed that the mere fact that a word persists is the main root of its semantic wanderings. We now admit that the *+ity* derivatives of adjectives of the form *Xous* must be listed in the lexicon. The reason for this is not semantic. However, it is evident that the first condition for semantic drift is now met: mere persistence. Note that with the small subclass of *Xous* adjectives where the marking is not arbitrary, those of the form *XVcious*, there is no need to enter individual derivatives in the lexicon, and hence no expectation that they will drift. This expectation is borne out by the data. A short perusal of the nouns in (5) shows that they are semantically coherent, and in accord with the general meaning for deadjectival abstract nouns.

Seen as a result of listing, semantic drift might itself undermine the productivity of the WFR whose derivatives must be listed. Once a class's semantics has become incoherent through semantic drift, we run into the same practical problem we faced concerning its form. Assuming of course that the meaning of an affix is connected somehow with its distribution, with its meaning in individual forms, our ability to predict the meaning of a new form will be impaired by the arbitrary meanings of the existing listed forms. Thus, listing may affect productivity through a semantic connection.

However, there is a more direct connection between lexical listing and productivity. The key to this connection is a phenomenon which I call *blocking*. *Blocking* is the nonoccurrence of one form due to the simple existence of another. In the case at hand, we find that whenever there exist in a given stem both an adjective of the form *Xous* and a semantically related abstract noun, then it is not possible to form the *+ity* derivative of the *Xous* adjective. The

[12] As with two-vowel languages, we could always reduce the number of marks by a simple redundancy rule, removing all instances of −R1 and restoring them by convention. Such a device merely masks the real situation, however, for neither + nor − is in any sense less marked here.

already existing noun blocks the new *+ity* derivative.[13] *#ness* derivatives of *Xous* adjectives are never blocked. The pattern is exemplified in (7):

(7)

Xous	*Nominal*	*+ity*	*#ness*
various	*	variety	variousness
curious	*	curiosity	curiousness
glorious	glory	*gloriosity	gloriousness
furious	fury	*furiosity	furiousness
specious	*	speciosity	speciousness
precious	*	preciosity	preciousness
gracious	grace	*graciosity	graciousness
spacious	space	*spaciosity	spaciousness
tenacious	*	tenacity	tenaciousness
fallacious	fallacy	*fallacity	fallaciousness
acrimonious	acrimony	*acrimoniosity	acrimoniousness
impecunious	*	impecuniosity	impecuniousness
laborious	labor	*laboriosity	laboriousness
bilious	bile	*biliosity	biliousness
pious	*	piety	piousness

[13] The blocking abstract noun is usually the base of the *Xous* adjective. Sometimes this fact is transparent:

(i)

melody	melodious
felony	felonious
glory	glorious
hazard	hazardous
outrage	outrageous
scandal	scandalous
trouble	troublous
libel	libelous
fame	famous
venom	venomous

Sometimes there is truncation of the base-final *y*:

(ii)

synonymy	synonymous
monotony	monotonous
larceny	larcenous
homophony	homophonous
mutiny	mutinous
felicity	felicitous

A more unusual form of truncation is found below:

(iii)

quotation	quotatious
disputation	disputatious
repetition	repetitious
contradiction	contradictious
caution	cautious
pretention	pretentious
deception	deceptious
superstition	superstitious

Note that *Xion* cannot be derived from *Xious* since there is already good evidence in many cases that *Xion* is derived from the verb: *deceive/deception, flirt/flirtation*. More on *Xion* can be found in chapter 5.

We can account for the distribution in (7) simply by appealing to the fact that *+ity* derivatives of *Xous* adjectives must be listed in the lexicon. We may assume that the lexicon is arranged according to stems, and that for each stem there is a slot for each canonical meaning, where "canonical" means derived by regular rules (we will say more about the semantics of WFRs in chapter 4). Let us furthermore assume that for each stem there cannot be more than one item in each meaning slot. If the *+ity* nominals are entered in the lexicon, then when we make up such a form we put it into the slot for abstract nominal for its stem. However, when there is already a nominal in the stem in question, then there is no room for the *+ity* nominal; it is blocked by the already occurring nominal. When there is no nominal in that stem, then we are free to insert the *+ity* form, though, as we have already noted, this will not always happen. Thus the mere fact that the *+ity* nominals must be listed accounts neatly for the distribution of most of the forms of (7).

What about the *#ness* forms, however? Why are they not blocked? The answer to this is straightforward: we have found no reason to list them. On the assumption that only words which are arbitrary in some way must be entered in the lexicon, there is no reason to enter the *#ness* derivatives of *Xous* adjectives in the lexicon. The most productive classes never have to be listed.[14] If the *#ness* forms are never listed, then they can never be blocked, and this is what we find. Nor will there be any sporadic gaps, since the concept of gap presupposes a list, and we have no list. Nor will they drift semantically, since on our account semantic drift itself presupposes that the item which drifts be listed in the lexicon.

The pattern which emerges from (7) can be systematically attributed to whether or not a new word is listed in the lexicon. The words which must be listed are blocked, and those which must not be listed are not blocked. The pattern thus directly supports our criterion for lexical listing. Less directly, it shows, like (5) and (6), the effect of phonological factors on productivity. That there should be such effects is interesting, for it brings out the remarkable interdependence of the various subsystems of language, an interdependence which is often ignored in analyses which are restricted to only one vantage point.

3.3. Conclusions

Several points emerge from our analysis. First, productivity goes hand in hand with semantic coherence. However, we have no real evidence as to which of these is primary, or even as to whether they are really distinct matters. The second point concerns the relationship between lexical listing and productivity. Here a simple sort of causality emerges. The listing of the output of a WFR in the lexicon leads to a loss in productivity. Almost incidentally, this second point answers a question posed at the very beginning of the chapter: Are all new words entered in the lexicon? The answer is no.

There is clearly much more work to be done here. We cannot claim to have discovered in these few pages all that there is to know about productivity. Some of the ideas have only been tentatively established, though I believe they point in the right direction. Yet, what has been said does rest on a concrete basis, and that is a step forward.

[14] To my knowledge, Zimmer was the first person to suggest that productive and nonproductive classes could be distinguished by claiming that only members of the latter were listed in the lexicon.

4: Word Formation Rules

Merely to say that words are formed from words is neither novel nor enlightening. To make the statement interesting, we must be able to make more precise claims about the nature of the rules which generate words, their form, the conditions under which they operate, and their relation to the rest of the grammar. The elaboration of such claims is the task of this chapter.

A basic assumption we will be making is that WFRs are rules of the lexicon, and as such operate totally within the lexicon. They are totally separate from the other rules of the grammar, though not from the other components of the grammar. A WFR may make reference to syntactic, semantic, and phonological properties of words, but not to syntactic, semantic, or phonological rules. Nor may a WFR refer to those properties of words which are directly associated with these rules, i.e. such properties as syntactic or phonological rule features. This is not a strange assumption. Though it is not controversial to allow a phonological rule to refer to the fact that a certain item is a verb, for example, one does not allow such a rule to refer to the fact that it is a verb that does not undergo the Passive rule. We will assume that a WFR, as well as not referring to other types of rules and related matters, cannot introduce rule-conditioned properties. This assumption is stronger than the last, and it will be discussed below. It is tied in with two earlier assumptions: that a WFR and its associated phonological operation are one and simultaneous; and that, as a consequence, words are entered in the lexicon in a fully concrete, specified form. A related assumption is that WFRs are different from other rules in the manner and occasion of their use. The syntactic and phonological rules are necessary and essential to the generation of every sentence. It is impossible to speak without using some analogue of the syntax and the phonology. However, this is not the case with the rules of the morphology. It is the dictionary entries themselves which are the input to the syntax and phonology, and the WFRs are merely rules for adding to and, derivatively, analyzing, these entries. Thus it is very easy to speak a sentence without having any recourse to these rules. They are not "on line". Though this fact does not necessarily mean that WFRs will differ from others in their formal properties, it does suggest that the two categories are quite separate.

For every WFR we must know two basic sorts of things. First, we must know what sort of information a WFR can have access to, and how it has access to this information. It is obvious that every WFR may have access to its base, i.e. the class of words on which it operates, and to the information contained in its base. It is also possible that a WFR can take into account information other than that contained in the base. It might have access to its own output, or to forms related to the base. However, access to anything other than the base calls