SIMULTANEOUS DUAL DERIVATION IN WORD FORMATION

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This article explores the nature of morphological categories by examining two of the most ubiquitous denominal adjective types, the possessional (*bearded*) and similitudinal (*friendly*) adjectives. Sometimes these adjectives are morphologically distinct, sometimes not; compare *icy road* and *icy hand*. This suggests that they are related yet not related. Language provides two means of generating these adjectives: TRANSPOSITION, which alters the lexical category of the base but not its grammatical features, and FUNCTIONAL DERIVATION, which alters the latter but not the former. This article shows how both adjectives may be derived simultaneously by both means. In order to understand fully the semantic effect of transposition on the base, it is necessary to clarify the distinction between the morphological and semantic categories involved and to demonstrate the impossibility of reducing either set of categories to the other.*

1. INTRODUCTION. The recent renaissance of morphological research has focused on the interfaces of morphology and syntax, on the one hand, and morphology and phonology on the other; little attention has been directed toward the nature of morphological categories themselves. In this article I propose to correct this imbalance by clarifying the nature of two lexical derivational categories and their relationship to semantic categories. I conclude that grammatical categories may serve semantic ones in a way which does not allow the reduction of grammatical categories to those of semantics.

In order to arrive at this conclusion, the article enters a controversy over the nature of word-formation rules. Advocates of what I will call WORD SYNTAX (after Selkirk 1982)—the proposition that morphology can be reduced to the principles of syntax, phonology, and semantics—have proposed that the semantic differential between the base and the derivate of some lexical derivations is explicable in terms of the argument structure or theta roles of the base (Selkirk 1982, Sproat 1985, Di Sciullo & Williams 1987, Lieber 1992). Under this hypothesis the English suffix *-er*, for example, fills the external or subject argument position of the verb, as in *employ* : *employer*. This distinguishes it from, say, the suffix *-ee,* which is lexically defined to fill the internal or object argument position, as in *employ* : *employee*.

Other morphologists, notably Aronoff (1976), Beard (1981), and Szymanek (1988), have argued that these derivations require the addition of a special function. In Beard 1981 I define these functions as those of the case system, e.g. subject, object, locus, means, manner, and possession; in other words, the same property functions which operate at the inflectional level (syntax)

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determine the range of possible lexical derivations. The focus of the present paper will be this issue. I will argue that both schools of thought are correct in that the meanings of certain classes of adjectives may be derived by two distinct means simultaneously; the argument structure of the base accounts for one, and the other is derived from accumulated grammatical functions. This duality of derivational origin not only produces semantic identity, but contributes to the high rate of productivity of such derivations, although the major factor in determining the productivity of any derivation is pragmatic demand.

At the heart of this article is an analysis of two denominal adjective types traditionally referred to as possessional and similitudinal adjectives, e.g. *bearded* and *friend-ly*, respectively. These are the two most productive denominal adjectives intra- and interlinguistically in that they seem to be present in virtually all languages with derivational morphology. They also seem to represent two of the most stable adjectival derivations diachronically, appearing, for example, in all modern Indo-European (IE) languages as well as in their parents, such as Vedic Sanskrit, Gothic, Classical Greek, and Latin; they are also highly salient in 16th-century Classical Nahuatl and in the modern dialects.

In this article I will propose two motivations for the high productivity of the two types: the need for names of natural properties in categorizing objects and the availability of two means of generating them. The two means of generation are TRANSPOSITION, the simple shift of a word from one category to another (with or without affixation), and FUNCTIONAL LEXICAL (L-) DERIVATION, the addition of some derivational function to a derivational base. In transposition, the meaning of a derivate is determined by the predicate argument structure of the base; in functional L-derivation, the function involved determines the meaning of the derivate. The remarkable aspect of this dual origin is that both origins produce the same meaning, given the correct assumptions about semantic composition.

I will follow Matthews 1972 in using the terms GRAMMATICAL CATEGORY for such classes as number, gender, tense, and aspect, and GRAMMATICAL PROPERTY for their membership, e.g. singular/plural/dual, masculine/feminine/neuter, present/past/future, and perfective/imperfective. Grammatical properties usually have several GRAMMATICAL FUNCTIONS; for example, singular marks collective and mass as well as count nouns, and the English past tense includes perfective (*I hugged John once*), frequentative (*I hugged him every day*), and emphatic (*I did hug him*) functions. The focal category is case, which has properties like nominative, accusative, genitive, and dative. Semantic categories and predicates will be capitalized to distinguish them from grammatical relations.

2. POSSESSIONAL AND SIMILITUDINAL ADJECTIVES. Of the two major denominal qualitative adjectives (QAdjs), the possessional adjective maps from a two-place predicate POSSESS(XY). The base of the possessional adjective coindexes specifically with the second or object argument of POSSESS(XY), so that the base of a possessional adjective is the object possessed, while its phrasal head represents the possessor: *the bearded man* = POSSESS(MAN,

BEARD).[1] For this reason let us henceforth refer to the possessional adjective as the OPAdj (OBJECT OF POSSESSION ADJECTIVE).

A similar characterization holds for SAdjs, which map onto a two-place predicate SIMILAR(XY), e.g. *friendly woman* = SIMILAR(WOMAN, FRIEND). Notice that only the second argument of SIMILAR(XY) maps onto the grammatical function. That argument must be satisfied lexically by the base of the derivation. The first argument may be filled only externally, in syntax, never internally, e.g. *friendly woman* but never **the womanfriendly girl* in the appropriate sense. Lexical mapping, therefore, is asymmetric with the semantic representation.

The reason for morphosemantic asymmetry in this case is clear. Adjectives take only one argument, while the predicate structures POSSESS(XY) and SIMILAR(XY) have two. How can a single-place predicate structure interpret a two-place predicate? The obvious means is to select either the subject or the object argument of the base to lexicalize in the derivation, allowing the alternative argument to be expressed in syntax. The OPAdj selects the object argument to map lexically onto the base in the output; the other argument is simply not written onto the output and is available to syntax, as in *bearded man*. This characterization of the OPAdj allows for another type of adjective based on POSSESS(XY) which lexicalizes the subject argument and ignores the object, what might be called a SUBJECT OF POSSESSION ADJECTIVE (SPAdj). Does such an adjective exist?

SPAdjs are productive in Serbo-Croatian under the name 'possessive adjective'. Any noun in Serbo-Croatian may be supplied with either the suffix *-ov* (for masculine and neuter nouns) or *-in* (for feminine nouns) and used to indicate the possessor, as illustrated in 1–2:

(1)	a.	*brat-ov-Ø šešir*	'[my] brother's hat' (lit. 'brother-POSS-MASC')
	b.	*brat-ov-a knjiga*	'[my] brother's book' (lit. 'brother-POSS-FEM')
	c.	*brat-ov-o drvo*	'[my] brother's tree' (lit. 'brother-POSS-NEUT')
(2)	a.	*sestr-in-Ø šešir*	'[my] sister's hat' (lit. 'sister-POSS-MASC')
	b.	*sestr-in-a knjiga*	'[my] sister's book' (lit. 'sister-POSS-FEM')
	c.	*sestr-in-o drvo*	'[my] sister's tree' (lit. 'sister-POSS-NEUT')

The relation of the base to the derivate in the adjectives in 1–2 is that of the subject argument to the semantic predicate POSSESS(XY). The relation of POSSESS(XY) to derivational morphology is thus asymmetrical: one semantic predicate maps onto two derivations.

[1] My definition of 'object argument' throughout this article rests on Levin & Rappaport's SOLE COMPLEMENT GENERALIZATION, which restricts passive adjectives to '[a]n argument that may stand as sole NP complement to a verb ....' (1986:631). For example, while *feed the baby some cereal* and *feed some cereal to the baby* are grammatical, only *unfed baby* is possible, not **unfed cereal*. This correlates with the fact that *the baby*, but not *some cereal*, can serve as the sole complement of the verb, i.e. *feed the baby* vs. **feed some cereal*. Notice that *cereal* is the theme and *baby* is the goal, and hence no consistent thematic analysis of this constraint is possible. The Lexeme-Morpheme Base Morphology approach proposed below incorporates a [+Object] feature from deep structure which is spelled out morphologically only if the head noun is the sole complement designate.

The evidence so far is also compatible with a purely semantic account of OPAdjs. However, the semantic account of POSSESS(XY) does not extend to SIMILAR(XY). SAdjs lexicalize only the object argument of that predicate morphologically; I have encountered no adjective which lexicalizes the subject relation. That is, there seems to be no adjective or noun like *friend-ish*, meaning 'friendly/a friend like X'. This unpredictable asymmetry between what is semantically available and what is morphologically possible forces a level of grammatical functions which selects semantic relations for morphological expression. Indeed, the very fact that derivation selects from a small subset of the available semantic relations itself suggests a level of morpholexical features between semantics and morphological representation which chooses the semantic relations that are to be represented in grammar. Even were it demonstrated that these relations are precisely the set of semantic primitives, we are left with the question of why some argument positions, like the subject of possession, are represented in derivation, but others, like the subject of similarity, are not. This sort of asymmetry between derivational functions and semantic representation, therefore, forces any adequate theory of grammar to distinguish the two levels.

The OPAdjs and SAdjs, then, must map through grammatical functions—say [Possess(Y)] and [Similar(Y)], respectively, where 'Y' represents the object argument—to affixation.[2] Let us now examine a random sample of them in three unrelated languages.[3] Ex. 3 illustrates the range of affixes expressing SAdjs in English; 4 is an illustrative sample of OPAdjs. The disparity between function and expression is explained in §3.1.

(3) a. *friendly*
b. *girlish*
c. *rusty* (*hair*)
d. *elephantine*
e. *quail-like*
f. *despotic*
g. *Nixonian*
h. *Romanesque*

(4) a. *bearded*
b. *sorrowful*
c. *rusty* (*knife*)
d. *dramatic*
e. *fashionable*
f. *modular*
g. *stylish*
h. *scrofulous*

Huasteca Nahuatl is a Uto-Aztecan language spoken by a population of about

[2] Throughout this article, square brackets have their usual value of marking features. The functions here are features added by lexical rule.

[3] This article is based on a survey of grammars and dictionaries of about fifty randomly selected languages. Languages exhibiting both of these derivations include Amharic, Arabic, Archi, Bashkir, Buryat, Czech, Dari, English, Fijian, Finnish, French, German, Classical and Modern Greek, Hausa, Hebrew, Indonesian, Italian, Koasati, Latin, Lezghian, Lithuanian, Classical and Huasteca Nahuatl, Navajo, Nganasan, Ossetian, Pashto, Polish, Russian, Serbo-Croatian, Spanish, Tagalog, Turkish, Warlpiri, and Yakut. Evidence of at least the OPAdj was found in Basque, Chukchi, Koryak, Pawnee, Yoruba, and Swahili; Tibetan apparently has the SAdj. Korean and Yupik maintain an assortment of qualitative verbs expressing the same relations; however, the Yupik possessional forms do not seem to be restricted to the relation of inalienable possession. In a few languages I found no evidence of either derivational relation in adjectives or nouns, but this may reflect the focus of available sources rather than the status of the language.

350,000 in Mexico. In the discussion of Huasteca Nahuatl adjective derivation in Beller & Beller 1979, the same two categories predominate. Table 1 provides a sampling of examples. Finnish exhibits the same semantic patterning and affixal variation across its denominal adjectives, as illustrated in Table 2 (data from Karlsson 1983:195–96). The fact that a wide variety of affixes usually mark these two lexical derivations attests to the productivity of the categories.

BASE	POSSESSIONAL ADJECTIVE	SIMILITUDINAL ADJECTIVE
popo 'smoke'	*tla-popo-ka* 'smoky'	
soki 'mud'	*soki-titla* 'muddy'	
saka 'grass'	*saka-titla* 'grassy'	
te 'rock'	*te-yo* 'rocky'	*te-tik* 'hard'
čil 'chili'		*či-čil-tik* 'red'
toma 'tomato'		*toma-wak* 'fat'
kama 'mouth'		*kama-wak* 'humid'

TABLE 1. Huasteca Nahuatl possessional and similitudinal adjectives.

BASE	POSSESSIONAL ADJECTIVE	SIMILITUDINAL ADJECTIVE
kala 'fish'	*kala-isa* 'abounding with fish'	
jää 'ice'	*jä-inen* 'icy'	
ase 'weapon'	*asee-llinen* 'armed'	
perhe 'family'	*perhee-llinen* 'with a family'	
isä 'father'		*isä-llinen* 'fatherly'
nainen 'woman'		*naise-llinen* 'feminine'
tyttö 'girl'		*tyttö-mäinen* 'girlish'

TABLE 2. Finnish possessional and similitudinal adjectives.

Three peculiarities of the two derivational categories require explanation. The first is that the meaning of the SAdj commonly combines with that of SPAdj, as Sussex (1974:117) first noticed:

(5) a. *Nixonian ethics*
b. *friendly smile*
c. *Napoleonic personality*

The semantic interpretation of these forms cannot be explained in terms of the function underlying the SAdj; that is, *Nixonian ethics* is not ethics like Nixon but ethics like those Nixon possesses, i.e. [X, SIMILAR(XY), POSSESS(NIXON,Y)]. Notice that *Nixon* is the first argument of POSSESS(XY), that of the SPAdj, the same as that of *Nixon* in *Nixon's hat* and *Nixon's policy*. This phenomenon suggests that POSSESSION (XY) and SIMILARITY(XY) are somehow related, a point to which we will return.

SAdjs are also characterized by a second peculiar attribute. While they all share the general meaning SIMILAR(Y), their actual reference is much more specific. *Rusty hair* means 'hair like rust in color'. An *icy hand*, however, means 'a hand like ice in temperature' while a *filmy gown* is 'a gown like film in texture'. Whatever the explanation of SAdjs, it must account for the specific semantic restrictions placed on the similitude involved.

Finally, most languages seem to have an intermediate category of adjectives bearing an identical affix but with both the OPAdj and SAdj meaning. In Eng-

lish, for instance, we find examples which, like those of 4, may be used in either the sense of 'have N' or in the sense of 'like N', e.g. *a sandy beach* versus *sandy hair* or *an icy river* versus *an icy hand:*

(6) a. *icy, dusty, rusty, fuzzy, sandy, lacy*
b. *arched, bowed, pointed*
c. *nodular, annular, columnar*

The Finnish suffix *-llinen,* too, may be combined with nouns to generate QAdjs with both meanings. This characteristic also suggests a relation between the two functions which otherwise distinguish OPAdjs and SAdjs.

We now have a description of the data and the problems associated with them. OPAdjs and SAdjs are among the most productive and diachronically stable denominal adjectivizations crosslinguistically. They are generally distinguished by sets of distinct affixes, often, however, the same affix marks both derivations, and many adjectives marked by the same affixes seem to have the combined sense of both SPAdjs and SAdjs. The intermingling of these two derivations is an interesting problem in itself; the answers to the questions they raise also bear on larger questions about the relation of grammar to semantics. To get at those larger questions, we next need theories of morphology and semantics.

3. THEORIES OF MORPHOLOGY AND SEMANTICS. The modified Government and Binding (GB) framework assumed in the arguments to follow is neither the simplest nor the most complex available. It includes a morphological component which is attached to the phonological component à la *SPE* (Chomsky & Halle 1968), but which is a discrete entity rather than a part of the phonological component. The framework is not based on the assumption of any syntactic-semantic homomorphism, as GB and Categorial Grammar (e.g. Hoeksema 1985) are, and hence requires no level of Logical Form. Rather, it assumes an independent level of semantics with its own principles and representations, associated with syntactic structures via a system of mapping principles. Both these modifications of the current GB (or Principles and Parameters) model represent recent innovations, so it makes sense to examine their essential claims before proceeding to the discussion of the adjectives.

3.1. LEXEME-MORPHEME BASE MORPHOLOGY. Lexeme-Morpheme Base Morphology (LMBM; Beard 1988, 1990, 1991b) distinguishes, first of all, LEXEMES from GRAMMATICAL MORPHEMES. Lexemes are restricted to the major class lexical items—noun, verb, and adjective. The lexicon is thereby rigidly maintained as a storage component solely for open-class linguistic signs. Not even pronouns are allowed in the lexicon since, although they belong to the lexical categories N, V, and A, they constitute closed classes. All lexemes are mutually implied triplets of phonological, grammatical, and semantic representations, as Figure 1 illustrates. The lexical (L-) derivational rules which convert the semantics of *novel* to that of *novelist* would add some grammatical features, say [+Subject] and [+Animate], to the grammatical representation of Fig. 1. The semantic effect of [+Subject] would be to bind the first argument of the function feature [WRITE(XY)] lexeme-internally to some category specifier, e.g.

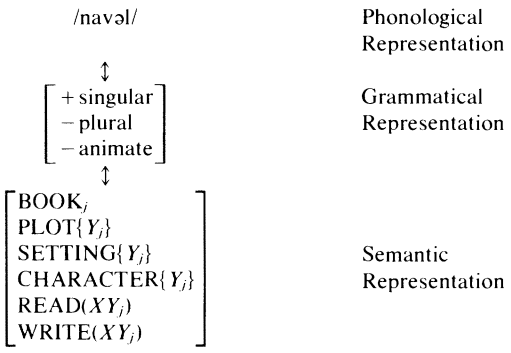

FIGURE 1. The lexeme *novel* under LMBM.

[ACTOR$_i$], which corresponds to [+Animate] at the grammatical level.[4] Crucially, the L-derivation rules involve no phonological modification of the phonological representation.

Grammatical morphemes include bound and free markers of grammatical categories. All affixes belong to closed classes which mark closed paradigms of grammatical categories and hence cannot be stored in the lexicon but require an autonomous postsyntactic component more related to phonology than to the lexicon (the Separation Hypothesis). Affixes are therefore purely phonological entities conditionally related to the grammatical functions which they express. Ex. 7 is a rough approximation of an affixation rule which suffixes *-ed* in English.

$$(7)\quad \emptyset \rightarrow /\text{-d}/ \quad / \quad \left[\begin{array}{l} \left\{ \begin{array}{l} +\text{Past} \\ -\text{Strong} \end{array} \right\} \\ \left\{ \begin{array}{c} +\text{Adjective} \\ [\text{Possess(Y)}] \\ \cdots \end{array} \right\} \\ \{ \quad \cdots \quad \} \end{array} \right]$$

The rule in 7 represents a single phonological operation with complex conditions which adds *-ed* to the phonological representation of any lexical stem bearing the grammatical features for regular past tense verbs or past participles (*baked, ruined, patted*), or any regular OPAdj (*bearded, eyed, long-legged*).[5]

[4] Why the production function [WRITE(XY)] rather than the purpose function [READ(XY)] is selected by the Subjective nominalization is an unsettled question at this point. The necessity of a production and purpose function has been recently pointed out by Pustejovsky (1991), who refers to them as 'Agentive' and 'Telic' functions, respectively.

[5] I am assuming that *-ed* is the productive marker of OPAdjs in English. Rule 7 does allow further conditions on this affixation, however. The suffix is unquestionably productive on compounds like *large-brained, bright-colored,* and *knobby-kneed.* Suffixation on simple OPAdjs varies materially because of lexicalized forms like *brainy, colorful, envious,* and *honorable.* Even among compounds it is often omitted if the reference is inanimate: *double-barrel(led) shotgun, long-nose(d) pliers, large-size(d) object.*

The assumption is that all morphological spelling (MS) rules are spelling operations rather than items retrieved from storage. The relation of an affix to its morphological features is indirect; features inserted by derivation become conditions on affix spelling. The rule that adds the features [+Adjective] and [Possess(Y)] is independent of all realization (spellout) rules. This allows the synchronic phonological identity to be represented theoretically as phonological identity even in the face of considerable variation in conditions.

An interesting prediction of the separation of derivation and affixation is that affixation will not be able to distinguish the inherent features of the base from those inserted by derivation. A substantial body of evidence bears out this prediction. Take, for instance, the common deadjectival nominal, e.g. *slow* : *slowness, intelligent* : *intelligence, able* : *ability,* and *white* : *white*(*ness*). The derivation is remarkably consistent, applying to all qualitative adjectives; but it never applies to relational adjectives. This one constraint, however, is irrelevant to the several affixes that productively mark the derivation. Rather, affixation rules must have access to (a) the current category of the stem, changed by derivation; (b) evidence of its previous category; (c) the phonological status of the base for the selection of *-ity* and *-ce* (/-s/); and (d) the semantics of color terms to assign the optional null marking. The last three features are inherent features of the base, not derivational features. As predicted by the Separation Hypothesis, the one condition on derivation is thus unrelated to those on affixation; moreover, the conditions on affixation are an indiscriminate combination of inherent and derivational features.

Figure 2 outlines a typical GB grammar with LMBM, showing the points at which L-derivation, morphosyntactic rules, and affixation rules apply. Lexemes are inserted after the base has generated a d-structure (roughly, a deep structure). L-derivation may operate before lexical selection or after it; the point is immaterial to the overall model. In the latter case, it might operate on a restricted range of d-structures, optionally converting phrases into simple and compound derived lexemes which retain their d-structure grammatical relations, along the lines of Botha's 1981 Base Rule Hypothesis. Morphosyntactic (inflectional) rules apply in syntax, again without inserting any affixation. Affixation, in the spirit of *SPE,* is a matter of semantically empty phonological

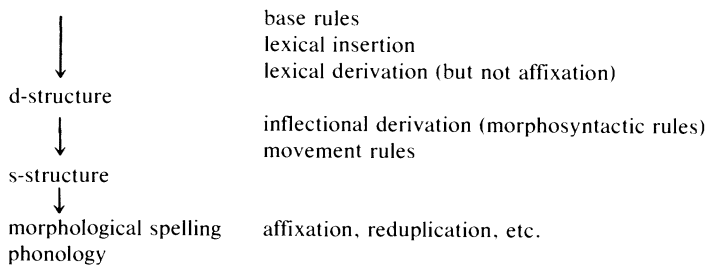

FIGURE 2. A typical LMBM grammar with autonomous morphology.

spelling, referred to here as morphological spelling (MS) operations, executed in an autonomous MS component.[6]

The separation of derivation from affixation provides a simple and natural explanation of zero and empty morphemes, as well as morphological asymmetry—the one-many and many-one relations between form and function which characterize morphology.[7] If derivation is carried out but no affixational operations occur, the result is zero morphology, as in (*to*) *cheat* → (*a*) *cheat*. If no derivation applies but a lexeme receives an affix for purely morphological or phonological reasons, like the suffix *-at* in Greek stems like *schema* : *schem-at-ic*, the result is empty morphology. Several affixes marking one function, such as the various forms of subjective nominalizations (e.g. *writ-er*, *typ-ist*, *inhabit-ant*, and *escap-ee*), result from multiple affixation rules applying to the output of a single derivation rule. The reverse situation, one suffix marking several derivations, is also well represented in my data, e.g. the OPAdj past-tense and participle marker *-ed* illustrated in 7, as in *bak-ed*, (*has* (*been*)) *bak-ed*, *forest-ed*. Separation also explains the extended and cumulative exponence of affixes documented in Matthews 1972.[8]

If the form and function of grammatical morphemes are provided by discrete components of grammar, a question naturally arises: how is one mapped onto the other? The answer is, via the lexeme. All bound grammatical morphemes are both formally and functionally bound to a lexeme. Since all lexemes are linguistic signs in LMBM, they provide the natural mapping device between meaning and form. All lexemes must pass through the MS component before entering phonology; it is therefore impossible for derivation rules to operate on lexemes without the MS component having the opportunity to respond. The definition of grammatical morphemes as markers (partially) conditioned by features left by derivational processes guarantees that the MS component will always respond appropriately. Both derivation and morphological spelling are thereby tightly constrained by the structure of the theory itself; no special conditions or ancillary subtheories are required to account for the entire range of possible morphological sound-meaning relations.

Figure 3 shows how derived lexemes with directly related sound and meaning may be generated without any direct relation between the rules of derivation and those of morphological spelling. *P* symbolizes the phonological representation of the lexical feature inventories of the major-class lexical items or lex-

[6] The order of the morphological spelling and phonology components is not a theoretical issue for LMBM: it may be that of Fig. 2 or they may be interleaved, as proposed by Lexical Phonology (e.g. Kiparsky 1982). The important point for LMBM is that phonological operations are distinct from derivational operations. It is quite possible under LMBM to incorporate morphological spelling into phonology; however, the body of evidence supporting such an approach is currently insufficient.

[7] See Carstairs (1987:12–18) for a recent review of form-function disjunctures. Keep in mind that he omits two major types, zero and empty morphemes; see Beard 1991c.

[8] LMBM is distinguished from Matthews' Word-and-Paradigm (WP) model and Anderson's 1992 version, which extends the model to agglutinative languages, in that Separation applies to both inflectional and derivational morphology. WP models separate derivation from affixation only in inflection.

LEXEME		DERIVATIONAL OPERATIONS	RESPONSIBLE GRAMMATICAL COMPONENT
R	←	Semantic operations	Semantics
↕			
G	←	Lexical derivation Inflectional derivation	Lexicon Syntax
↕			
P	←	Spelling operations Phonological operations	MS component Phonology

FIGURE 3. Derivational and spelling operations in LMBM.

emes, N, V, and A. *G* designates the grammatical representation and *R* the semantic representation, as specified in Fig. 1.

The relation between the derivational and MS operations, as Fig. 2 demonstrates, consists in their operation on the same objects, lexemes, such as that in Fig. 1. However, the derivational and spelling operations are quite distinct processes carried out on two different parts of lexemes, a situation which cannot be expressed by the binary homomorphic affixes of other morphological models. Although MS operations often parallel those of derivation, they need not do so in one-to-one fashion. This is why Matthews 1972 argued that only the 'word' is a sign. If we assume that 'word' refers to the fully derived lexeme, only lexemes are signs; grammatical morphemes are radically different constituents.

The focus of LMBM research up to this point, as Carstairs-McCarthy (1992: 172–3) points out, has been the categorial types of lexical and inflectional derivation as defined here. Two distinct types of L-derivation were originally identified in Kuryłowicz 1936, one which involves semantic change and one which does not. An example of an asemantic TRANSPOSITION, to use Marchand's 1967 term, is the deadjectival nominalization, e.g. *happy* → *happiness*. The references of productive pairs like *happy* and *happiness* are identical: both refer to the state of happiness, either as a category itself (*happiness*) or as a natural property of some other category (e.g. *happy person*). Transpositions are derivations which change the category of the base alone.

Languages with morphology also regularly possess FUNCTIONAL L-DERIVATIONS which add grammatical functions like subject, object, locus, means, and goal to the base, as in *bake* → *baker* and *bake* → *bakery*. An example of a pure functional derivation (Beard 1988; Marchand's SEMANTIC DERIVATION) is the denominal agentive nominalization mentioned above, e.g. $novel_{N}$ → $novel\text{-}ist_{N}$. Here the features [+Subject] and [+Animate] are added, as discussed previously, so the function changes, but not the syntactic category. Many derivations reflect a combination of transposition and functional derivation; the deverbal nominalization in $bake_{V}$ → $baker_{N}$, for example, not only transposes the syntactic category from V to N, but also adds the grammatical functions [+Subject] and [+Animate], as in the case of *novelist*.[9]

[9] Booij 1986 provides reason for concluding that the functions here are grammatical (morphological) and not semantic. Booij points out that 'agentive' nominalizations are often subjective but not agentive, as in *breaker*, *sparkler*, and *shiner*.

To summarize, then, the basic assumption of LMBM that is germane to this article is that all derivational processes are independent of processes of affixation. The latter operations are exclusively phonological in their nature, involving neither semantic nor grammatical properties or operations. Derivation, by contrast, comprises lexical and syntactic operations on such grammatical functions as perfective, frequentative, durative, subject, object, and locus, which belong to properties like perfective, imperfective, nominative, accusative, and locative of categories like tense, aspect, and case. These operations are grammatical even though they have semantic effects. The two grammatical functions of special interest here are [Possess(Y)] and [Similar(Y)], which determine the OPAdj and SAdj, respectively. Finally, there are at least two different types of L-derivation, transposition and functional derivation; these are important to the arguments below that OPAdjs and SAdjs conform to the descriptions of both types of L-derivation. To understand how this is possible, let us next prepare the semantic groundwork.

3.2. CONCEPTUAL SEMANTICS. Jackendoff (1983, 1990) lays out an explicit, formal theory of semantics which departs from other current theories in several important ways. First, he postulates an autonomous level of semantics that assumes neither an isomorphism nor a homomorphism with syntax. The relation of semantics and syntax becomes an empirical question and requires principles of mapping from one domain to the other. Jackendoff assumes that grammar contains at least two sets of CORRESPONDENCE RULES, one which maps syntactic structure onto phonological structure and another which maps syntactic structure onto semantic structure.

Formally, Jackendoff's system rests on eight primitive conceptual categories which underlie all semantic representations of lexical items: THING, EVENT, STATE, ACTION, PLACE, PATH, PROPERTY, and AMOUNT. The mapping of these conceptual categories to syntactic categories is many-many, such that an NP, for example, may express a THING (*the dog*), an EVENT (*a war*), or a PROPERTY (*redness*). A PP may express a PLACE (*in the house*), a PATH (*to the kitchen*), or a PROPERTY (*in luck*). These categories play a central role in the argument structures of the semantic representations of lexical items which form the basis for the semantic interpretations of sentences. Ex. 8 is a typical lexical entry in the Jackendoff framework:

(8) $$\left[\begin{array}{l} \text{enter} \\ \text{V} \\ \text{\_\_ } \langle \text{NP}_j \rangle \\ [_{\text{EVENT}}\ \text{GO}\ ([_{\text{THING}}\ ]_i,\ [_{\text{PATH}}\ \text{TO}\ ([_{\text{PLACE}}\ \text{IN}\ ([\ _{\text{THING}}\ ]_j)])])] \end{array}\right]$$

The lexical entry for *enter* comprises a phonological representation, a grammatical representation [V, __⟨NP$_j$⟩], and a semantic representation, essentially identical with the LMBM entry illustrated in Fig. 1. The semantic representation defines the function as an EVENT involving movement ([GO]) by any THING along a PATH TO a PLACE IN some other THING. It incorporates the same PATH and PLACE functions as the preposition *into*, accounting for the synonymy of *enter* and *go into*. While these two expressions are radically

different at the syntactic level, they are identical at the semantic level—precisely what a semantic theory should predict.

Jackendoff also derives a system of coreference from theta roles and argument structures whereby sub-*i* is coreferenced with the subject and sub-*j* is coreferenced the (first) object. Notice that, in the case of *enter*, the syntactic object corresponds to the object of the PATH category IN at the semantic level rather than to the second argument of the predicate. This again is the sort of syntactic-semantic disjuncture which a semantic theory must account for and which Jackendoff's approach handles gracefully. The empty brackets in the semantic representation of 8 are for the semantic content of subject and object tokens.

3.3. DECOMPOSITIONAL COMPOSITION. I argued in Beard 1991a that exactly three types of semantic features are required in lexical entries to account for morphosemantic mismatches. First, lexical entries must be specified for SEMANTIC CATEGORY; for instance, a *friend* is a member of the category ACTOR as opposed to, say, ARTIFACT or VEGETATION.[10] Second, lexical entries also have SEMANTIC FUNCTIONS; the function of a hammer, for instance, is to pound: [POUND([$_{\text{THING}}$], [$_{\text{THING}}$])]. Nothing here differs crucially from Jackendoff's proposals. Beard 1991a does extend Jackendoff's terminology by allowing elementary status for a semantic operator denoted by curly brackets, Q{[ ]}, representing the relation of a SEMANTIC PROPERTY to the category it defines. The reasoning for this is that, since lexemes name categories and relations, they must be associated with the kinds of properties required to identify the categories and relations that they name. Moreover, the property relation signified by curly brackets must be distinguished from other types of features somehow in order to account for the types of attributive composition described in Beard 1991a and in §4 below. Lexical entries for categories like KNIFE, for example, should contain (a) features identifying any relevant hypernyms, e.g. $_{\text{Thing}}$TOOL; (b) any relevant semantic properties, e.g. TOOL{[HANDLE]} or TOOL{[BLADE]}; and (c) any semantic functions relevant for identifying the category, e.g. CUT([$_{\text{ACTOR}}$], [$_{\text{THING}}$], [$_{\text{USE}}$]).

This slightly enhanced version of Conceptual Semantics is applied in Beard 1991a to the issue of bracketing paradoxes or morphosemantic mismatches like those in 9.

(9) a. *good writer*
b. *criminal lawyer*
c. *moral philosopher*

[10] 'Semantic' is used here to distinguish grammatical categories from general cognitive ones. The exact nature of cognitive categories is not relevant to my arguments so long as they are ultimately definable either in terms of the 'natural' world or in terms of Jackendoff's 'projected' world. (The latter refers to the natural world as perceived and conceived by the mind.) The semantic properties of an owl in the projected world, for example, might equally be feathers, two wings, and unusual wisdom. Even though the bird does not possess unusual wisdom in the natural world, in the conceptual world it does; otherwise expressions like *she is wise as an owl* would be anomalous. Jackendoff argues that semantic categories are conceptual, that is there is no autonomous semantic level between grammar and conceptual structure. See Pustejovsky & Bergler 1992 for arguments for and against this position.

Good writer, for example, has at least two readings. One implies that the writer is a good person, while the other refers to someone who writes well.

Beard 1991a shows that these mismatches are the result of sublexical (featural) composition which characterizes nonderived nouns as well as derived ones. That is, attributes generally do not compose with their heads as lexicosyntactic wholes, but rather compose with them feature by feature. *Old* in *old friend,* for example, does not compose with *friend* as a lexical whole; instead, it composes with individual semantic features of *friend.* Let us begin with the reasonable assumption that the definition of *friend* is something like 10:

(10) $\begin{bmatrix} \text{ACTOR}_i \\ \text{FRIENDSHIP}([\ ]_{\text{ACTOR}i}, [\ ]_{\text{ACTOR}j}) \end{bmatrix}$

ACTOR is a category of animate beings which cause things to happen, i.e., [ANIMALITY{[THING]}]. FRIENDSHIP is a complex or unique feature describing friendship. According to the principle of Decompositional Composition, *old* may take either ACTOR or FRIENDSHIP ($[\ ]_i$, $[\ ]_j$) as its argument, resulting in two semantic interpretations of the same syntactic structure:

(11) a. $[\text{OLDNESS}\{[\text{ACTOR}]_i\}\ \text{FRIENDSHIP}([\ ]_{\text{ACTOR}i}, [\ ]_{\text{ACTOR}j})]$
b. $[\text{ACTOR}_i\ \text{OLDNESS}\{[\text{FRIENDSHIP}([\ ]_{\text{ACTOR}i}, [\ ]_{\text{ACTOR}j})]\}]$

The semantic content of *old* is represented with a noun, OLDNESS, since the curly brackets describe the appropriate relation, that of a semantic property. An *old friend,* then, according to 11, may be an old actor in a friendship (11a) or an actor in an old friendship (11b), precisely the two interpretations required. In other words, semantic composition obeys semantic rules operating over purely semantic entities. It follows that semantic composition is not isomorphic or even consistently homomorphic with syntactic structures; rather, semantics seems to constitute an independent module which interprets syntax in its own terms.

Notice that the morphosemantic mismatches of 9 represent exactly the same type of ambiguity. Let us assume that the meaning of *good* is GOODNESS{[ ]}. If the meaning of *writer* is then $[\text{ACTOR}_i\ \text{WRITE}([\ ]_i, [\ ]_j)]$, Decompositional Composition renders the two interpretations of *good writer* in 12:

(12) a. $[\text{GOODNESS}\{[\text{ACTOR}]\}_i\ \text{WRITE}([\ ]_i, [\ ]_j)]$
b. $[[\text{ACTOR}_i\ \text{GOODNESS}\{\text{WRITE}([\ ]_i, [\ ]_j)]\}]$

In other words, a good writer may be a writer who is good as a person (ACTOR) or a person who writes well—again, the correct range of readings.

The important point of Decompositional Composition, then, is that the semantics of an adjunct may select a single feature of its head. A relevant question arising from this discovery is whether the obverse is also possible: may a single feature of the adjunct select the feature(s) of the head? The next section will provide evidence that this logical possibility is invoked commonly in semantic processing.

4. POSSESSIONAL AND SIMILITUDINAL ADJECTIVES AS TRANSPOSITIONS. As indicated in §3, OPAdjs and SAdjs have historically been assumed to be derived by special predicates, e.g. POSSESS([Y]), SIMILAR([Y]). I concluded in Beard 1991a, however, that most of the derived QAdjs involved in bracketing paradoxes are pure transpositions like those discussed at the end of §3.1. That is, their semantic representation is identical with that of the underlying noun; only their syntactic category has changed. Let us examine a single adjective which has an OPAdj and an SAdj interpretation, under the assumption that either the OPAdj or the SAdj might be a transposition. Consider first how *rust* might compose with each feature of *knife* in *rusty knife*, providing all the semantic interpretations of the OPAdj, i.e. a knife possessing rust on some part of it (the dotted line indicates anomalous composition).

(13)

RUST	KNIFE
SUBSTANCE$_i$	TOOL$_j$
BROWN{REDNESS{[ ]$_i$}}	HANDLE{[ ]$_j$}
CORRODE([ ]$_i$,[ ]$_j$)	BLADE{[ ]$_j$}
CONTAIN([ ]$_j$,[IRON or STEEL])	CUT([ ], [ ],$_{\text{USE}}$[ ]$_j$)

Ex. 13 indicates that rust is a substance which corrodes other things ([ ]$_j$) so long as those things contain iron or steel. Moreover, rust is characterized by a specific color property, a brownish redness. The brackets are used according to Jackendoff, referring to semantic categories; their coindexing reflects argument structure, *i* denoting the subject and *j* the object.

Notice that to describe *rusty* semantically in terms of the noun *rust* will require distinguishing semantic properties by curly brackets on two levels. One, the external set, identifies the transpositional relation of the derived adjective *rusty* to the referential term *rust* underlying the QAdj. The other, the internal set, identifies the inherent semantic properties of rust itself, including its distinctive reddish-brown color. Since the derived adjective, *rusty*, is adjoined to the head noun, *knife*, as a whole, we would expect the semantic representation of *rust* as a whole to compose as a property feature of the noun. In this case it would attribute all the features of rust to those parts containing iron or steel and thus not excluded by the selection restriction, [CONTAIN([ ], [IRON or STEEL])]. However, if the semantic component is genuinely autonomous and in possession of its own rules of composition, we might also expect semantic operations to ignore the syntactically relevant levels here and allow the semantic representation of the head to assume the argument position of any available semantic property of the attribute represented by {[ ]}. If this were the case, both instances of {[ ]} associated with RUST in 13 would be available for composition if the internal set were not coreferenced with the category of *rust*, SUBSTANCE.

Imagine now that the semantic principles of QAdj adjunction look for any property specifier, ignoring all indexation. Semantic mapping rules are free to coindex the selected feature of the the head with either the external or some internal property argument position in 13. The selection of an internal position would abrogate all the internal lexical coindexation. If we assume that an ar-

gument position may be coindexed with only one referential term, the semantic component would require the power to preempt the indexation of semantic features in lexical entries. While the power of the rules of semantic composition increases with this step, they are still properly constrained so long as we maintain the independently motivated filter against multiple indexation of argument positions. Either all the indexation internal to a lexical entry is preserved and is posited in its entirety as a function of the head noun, or all the internal indexation is neutralized and only one internal property feature is selected as the function.

Given this assumption, SAdjs, too, may be seen as pure transpositions if we now allow the semantic representation of the head to select either the property argument of the entire QAdj to produce an OPAdj like *rusty* in *rusty knife*, or any one of the internal property arguments, e.g. [BROWN{REDNESS {[ ]}}], as illustrated in the lexical semantic structure for *rusty hair* in 14.

(14)

RUST		HAIR
SUBSTANCE$_{ø}$		MASS([THING]$_i$)
BROWN{REDNESS{[ ]}}	{[ ]}	FLEXIBILITY{[ ]$_i$}
CORRODE([ ]$_{ø}$,[ ]$_{ø}$)		MINUTENESS{[ ]$_i$}
CONTAIN([ ]$_{ø}$,[IRON or STEEL])		ELONGATION{[ ]$_i$}
		GROW([ ]$_i$,$_{Place}$ON([$_{Thing}$Body]))

In 14 the referential indices have been neutralized because one property feature of the noun *rust*—rather than that of the adjective as a whole—has taken *hair* as its argument, thereby disrupting indexation. The result is the attribution of only one property of rust to hair; the semantic effect is the interpretation of SAdjs like 3 above: [BROWN{REDNESS{HAIR}}]. In other words, the semantic mapping operation determining both OPAdjs and SAdjs is now the same inalienable property of Q{[ ]}. If the entire feature inventory of *rust* is attributed to the head, as in *rusty knife*, the semantically equivalent paraphrase is 'a knife which has rust (on it)'. If, however, only one property of rust, namely its color, is attributed to the head, the paraphrase is 'having the color of rust' or 'like rust (in color)'.

The function [Similar(Y)] then reduces to PROPERTY ([Y]) applying to a single feature of Y rather than to Y as a whole, and it may be omitted in an account of SAdjs. Moreover, the relation PROPERTY([Y]) is a primitive operator Q{[ ]}, relating a semantic property to the category which it partially defines. It follows that both the OPAdj and the SAdj may be derived by simply transposing nouns to QAdjs, thereby adding the purely grammatical features which distinguish QAdjs in general from nouns. If we assume that the semantic purpose of QAdjs is, as their name implies, to designate qualities (= properties), then by definition they bear the semantic relation Q{[ ]}. The semantic effect of transposing a noun to a QAdj is thus to convert the semantic representation of the underlying noun from [X] to [X{[ ]}]. No further grammatical operation is required.

The conclusion that both OPAdj and SAdj L-derivations are in fact the effects of the same semantically empty derivational process explains the three puzzling

aspects of their behavior mentioned in §2. Recall first the tendency of these QAdjs to exhibit the effects of both SAdj and SPAdj derivations simultaneously, as in *Nixonian ethics, friendly smile,* and *Napoleonic personality.* A Napoleonic personality, for instance, is neither a personality like Napoleon nor a personality which inherently possesses Napoleon; rather, it is a personality like that which Napoleon possessed. The concept NAPOLEON must contain some feature referring to a special semantic property, say a kind of arrogance which distinguished Napoleon from other historical figures. We will call this property [N-HUBRIS{[ ]}] and assume that it is semantically recognizable. The appropriate reading of a phrase like *Napoleonic personality* is consistently achieved by coindexing that feature with the head noun, PERSONALITY, so that the hubris possessed by Napoleon becomes its property:

(15) NAPOLEON PERSONALITY

$$\begin{bmatrix} \text{ACTOR}_{\emptyset} \\ \text{N-HUBRIS}\{[\ \_\__j\ ]\} \\ \dots \end{bmatrix} \longrightarrow [F_j]$$

The result of composition on 15 would be [N-HUBRIS{[F]}], where [F] is the feature of PERSONALITY which [N-HUBRIS {[ ]}] selects, probably its category specifier. If PERSONALITY is a superordinate category itself, correspondence rules would generate [N-HUBRIS {[PERSONALITY]}]. [N-HUBRIS] would have to be located in the lexical entry for Napoleon. By this interpretation, a Napoleonic personality is one which inalienably possesses this trait of Napoleon as a semantic property, just as *rusty hair* is hair with the redness of rust as a semantic property. No special semantic interpretation of the N → QAdj transposition is required beyond that required of metaphoric compositions like *rusty hair.*

Second, this account of OPAdjs and SAdjs as outputs of transposition explains the ostensibly idiomatic variation in the specific meanings of SAdjs. As illustrations, consider the following SAdjs taken from the Huasteca Nahuatl data in Table 1:

(16) a. *te* 'rock' *te-tik* 'hard'
b. *čil* 'chili' *či-čil-tik* 'red'
c. *kama* 'mouth' *kama-wak* 'humid'
d. *toma* 'tomato' *toma-wak* 'fat'

SAdjs do not simply signify a general similarity between their underlying noun and head noun; they attribute specific properties of their underlying noun to the head N. The SAdj for *te* 'rock' in Huasteca Nahuatl means 'like a rock in density', the SAdj from *čil* 'chili' means 'like a chili in color', and the SAdj from *kama* 'mouth' means specifically 'like a mouth in moisture content'. Although the SAdj equivalent to *rocky* in Huasteca Nahuatl, *te-tik,* means 'hard', in other languages it means 'lifeless'; compare, for instance, Bulgarian *kamenno sərdce* 'heart of stone'.

Finally, the single transpositional origin also explains the third puzzling aspect of OPAdjs and SAdjs—the fact that a single affix often marks both deri-

vations, e.g. English *sandy beach* versus *sandy hair*.[11] If the two QAdjs are the product of a single L-derivation operation, transposition, and are distinguished only by semantic interpretation, the identical morphological marking does not raise any question at all. However, if these two L-derivations are in fact the output of a single transposition, a new question arises: why are the OPAdj and the SAdj readings ever distinguished by two sets of affixes?

5. DUAL DERIVATIONAL ORIGIN. The distinctive affixation which we find in examples such as those in Tables 1 and 2, and English examples like those in 3–4, suggest that two L-derivational operations are at work. However, we have just seen that the semantic effect of both derivations is the same, assuming a theory of metaphor which allows the featural composition of a head with a single property feature of its attribute. If these derivations were driven purely by semantics, the distinctive affixation could not be explained. However, if the derivations are licensed at the grammatical level by distinctive functions, we have no explanation for the frequent identity of the affixation. How may we resolve this apparent paradox?

5.1. OPADJS AND SADJS AS FUNCTIONAL L-DERIVATIONS. There is an intuitive resolution of the paradoxical morphology which we find on OPAdjs and SAdjs. In addition to representing the output of N → A transposition, these adjectives may also represent two functional L-derivations based on grammatical functions. I have proposed (Beard 1981, 1990) a universal constraint on functional L-derivations called the UNITARY GRAMMATICAL FUNCTION HYPOTHESIS. This hypothesis restricts the range of functional L-derivations to the range of grammatical functions found in inflection. That is, the same functions that determine inflectional relations, especially case relations, also determine the semantic range of functional L-derivations. In Beard 1991b I further define case relations as those configurational and adverbal relations marked either by complete morphological case systems or by adpositions, or by some combination of the two. This proposal differs from Case Grammar only in that, under the present proposal, the functions (deep cases of Case Grammar) of case markers and adpositions are grammatical rather than semantic.

The case functions which correspond to the OPAdj and SAdj functional L-derivations are possession and similitude, marked in English syntax by the prepositions *of/with* and *like;* compare *a beach of/with sand* and *hair like sand* with *sandy beach* and *sandy hair*. The Unitary Grammatical Function Hypothesis provides independent motivation for possessional and similitudinal L-derivations. It follows that, in addition to its ability to derive OPAdjs and SAdjs

[11] The two senses of *sandy* included here are not intended as a complete list of the uses of this adjective. Mark Aronoff (personal communication, 1992) has pointed out that the love scene on the beach in *From Here to Eternity* might be referred to as a *sandy experience*. Of course, the implication is not that the experience itself had sand on it, but rather that those who participated in the love scene had sand on them. This is an instance of the causative usage of QAdjs; cf. *John read a sad story*, where *sad* composes with *John* rather than *story*, marking the story as the cause, not the experiencer, of the sadness. In the phrase *Deborah Kerr had a sandy experience* ..., Ms. Kerr would be the sandy referent, and the experience would be the cause of her being sandy.

by a single transposition, the lexicon is also capable of two L-derivations which incorporate the [Possess(Y)] and [Similar(Y)] functions.

These same functions are marked by case endings alone in other IE languages. The Possess([Y]) function underlies the traditional IE genitive of quality, while similitude is marked by the instrumental in Balto-Slavic languages. In Serbo-Croatian, for example, constructions like *čovek plavih očiju* (lit. 'person blue.GEN eyes.GEN') 'a person of (with) blue eyes' are productive. Paralleling the inflectional function is the productive possessional L-derivation which generates *plavook čovek* (lit. 'blue.eye person') 'blue-eyed person'. Russian marks similitude with the instrumental case on nouns referring to animals, e.g. *on voet volk-om* (lit. 'he howls wolf-INST') 'he howls like a wolf'. Parallel to the inflectional function we find a lexical function in such expressions as *volč-ij appetit* 'a wolfish appetite'. On the basis of parallels such as these, in addition to phonological parallels and other types of evidence, I concluded in Beard 1990 (and see also Beard 1991b) that lexical and inflectional derivational categories are the same and that all differences between them are determined by the different components in which they operate.

This line of reasoning leads to the conclusion that the same semantic effect as that of the transposition examined in §4 may be achieved by adding two independently motivated grammatical functions, [Possess([Y])] and [Similar([Y])], to a nominal base. We now have a prima facie answer to the question left open at the end of §4: why are OPAdjs and SAdjs sometimes distinguished affixally and sometimes not? Aside from generation by transposition, they are simultaneously derivable by distinct L-derivations operating over two discrete universal grammatical functions. Since the morphological spelling operations are conditioned by grammatical functions, transposition and the two functional L-derivations exert two pressures on the MS component—one to distinguish the two functional L-derivations phonologically and the other not to distinguish them.

The LMBM solution to these problems requires no expansion of the current theory, yet the generation of such doubly motivated derivates is properly constrained. Both transposition and functional derivation are widely attested morphological operations. Transposition excludes the addition of any semantic or grammatical material aside from lexical category features, while functional L-derivations are restricted to operating on functions found in the case-adposition system.

5.2. OPADJS, SADJS, AND THE PROPERTY FUNCTION. The semantic coincidence of the QAdj transposition with the two grammatical function derivations predicts greater productivity of denominal adjectives with the meanings of OPAdjs and SAdjs. If derivation by one of these means is blocked, say by a shortage of appropriate affixes (see Beard 1990), another avenue for deriving the same meaning is available. A significant motivation for the unusually high productivity of OPAdjs and SAdjs is that their purpose is to label properties of cognitive categories. Now since categorization is a fundamental cognitive process, derivational operations which play direct roles in this process are

central to mental processing. These operations are predictably prominent among the naming functions of language, such as L-derivation.

6. CONFIRMATION: SUBJECTIVE AND OBJECTIVE DEVERBAL ADJECTIVES. If the OPAdj and the SAdj represent an isolated instance of dual origin, they are little more than a curiosity. However, their dual origin seems to be an instance of a more general phenomenon. Participial adjectives are also highly productive and susceptible to two accounts under LMBM. Two variants of these are found consistently across the languages examined for this study (see n. 3 above), seemingly distinguished by the active and passive voice; the English active and passive adjectives and participles are typical. Table 3 demonstrates that the suffix *-ing* is used to mark a lexical active adjective and an inflectional present active participle which differ only in ways that otherwise distinguish lexical from syntactic derivations.

	ACTIVE ADJECTIVE	ACTIVE PARTICIPLE
DISCRETE	*is (very/un)product-ive*	*(not) produc-ing (very much)*
AFFIXATION	*is (very/un)repent-ant*	*(not) repent-ing (very much)*
	is (very/un)compliment-ary	*(not) compliment-ing (very much)*
IDENTICAL	*is (very/un)surpris-ing*	*(not) surpris-ing (very many)*
AFFIXATION	*is (very/un)excit-ing*	*(not) exciting-ing (very much)*
	is (very/un)mov-ing	*(not) mov-ing (very much)*

TABLE 3. Active adjective and participle in English.

The lexically derived adjectives in English are only sometimes differentiated from the syntactically derived participle. An array of suffixes, including *-ive*, *-ənt*, and *-ary*, are added to many Latinate stems, while *-ing* marks both participles and adjectives derived from native stems. Syntactically derived participles, however, are distinguished by their incompatibility with the adjectival prefix *un-* and intensifiers like *very;* they require *not* and *very much* or *a lot*. Furthermore, the participle but not the adjective accepts the complement of the base: *the man not annoying his friend* but **the man unannoying his friend*. Finally, the adjective but not the participle compares and nominalizes (*more productive, productivity* vs. **more producing (it)*, **producingness*).[12]

The evidence initially points to a transpositional relation between the verb

[12] The suffix *-ing* allows little additional affixation other than the plural marker *-s*, which is permitted when *-ing* is used as a nominalizer (as in *winnings, beatings,* and *killings*), and *-ly*, when *-ing* is used to derive adjectives (e.g. *annoyingly, movingly,* and *surprisingly*). The suffix *-ing* normally blocks deadjectival nominal transpositions like **annoyingness*, **movingness*, **surprisingness*. However, Richard Sproat (personal communication, 1993) points out that such derivates are fairly common, as in the following examples from the AP newswire: *boringness, caringness, daringness, easy-goingness,* and *law-abidingness*. Such constructions would probably not be accepted by some speakers, but regardless of their status in Standard English they support the claim that their bases are lexical adjectives. They also support the Separation Hypothesis. We would expect to find examples of this sort only if the derivation had fewer constraints than the affixation marking it. However, derivation and affixation must be discrete for one to be more productive than the other.

and the active deverbal adjectives. The problem with this hypothesis is that the languages examined in this study which exhibit this deverbal adjective generally possess another adjective which may be derived from verbs without the addition of any grammatical function except passive voice, e.g., English *John is very annoyed*. This adjective refers to a state, e.g. *annoyedness*, while the active deverbal adjective refers to a proclivity to act, e.g. *annoyingness*.[13]

Table 4 demonstrates that the evidence for this division is the same as that for the present participle and active adjective, except that passive adjectives do not differ morphologically at all from the corresponding passive participle.[14] Even the most idiosyncratic of suffixes are used without exception to mark the inflectional and L-derivations based on the same verb stem and function. All other syntactic and semantic differences found among the active correlates are present, however. The adjectives do not freely adverbialize or nominalize; however, this also may be due to the fact that the suffix used to mark these derivations is terminal, not allowing any further affixation.[15]

ADJECTIVES	PARTICIPLES
is (very/un) bent	*(not) bent (very much)*
is (very/un) mov-ed	*(not) mov-ed (very much)*
is (very/un) surpris-ed	*(not) surpris-ed (very much)*
is (very/un) swoll-en	*(not) swoll-en (very much)*

TABLE 4. Passive adjective and participle in English.

To maintain the transpositional account of active and passive adjectives, we must accept both as transpositions. There is no obvious basis for accepting one as a transposition and not the other. If we reject both, the hypothesis that these adjectives are derived by both functional derivations and transpositions fails, because the only other universal deverbal adjective is the passive potential (e.g. *doable*), which apparently contains the two grammatical functions indicated by its name. If we accept the active and passive participial adjectives as the deverbal adjectival transpositions predicted by our hypothesis, we must explain (i) why the passive variant seems to imply perfective aspect (or past tense) and (ii) why there are active and passive variants.

[13] See Siegel 1973, Wasow 1977, Bresnan 1982, Williams 1981, Emonds 1985, Levin & Rappaport 1986, Milsark 1988, Sproat (1985:306–12), Brekke 1988, and Borer 1990 for a closer characterization of the two adjectives and their corresponding participles.

[14] Some languages do distinguish passive participles from passive adjectives. In Bashkir, for example, the suffix *-KAn* marks the positive past participle, e.g. *köt-kən xəbər* 'expect-ed news' and *kil-gən qunaq* 'arriv-ed guest'. Passive adjectives, however, are marked productively with *-(O)q*, e.g. *boð-* 'spoil' : *boð-oq* 'spoiled', *tim-* 'calm, pacify' : *tim-iq* 'pacific', and *ton-* 'clarify' : *ton-oq* 'transparent' (Juldashev 1981:176, 314–5).

[15] The dearth of adverbalizations and nominalizations in English may be the result of properties of the particular affixes, as in the case of derivations based on *-ing* (see n. 12). The corresponding adverbs and nominals seem to be licensed in this case by an epenthetic vowel in the suffix, e.g. *markedly, pointedly, disjointedly; markedness, pointedness, disjointedness, preparedness, ?swollenness, ?misguidedness* versus **bentness, *movedness, *plasteredness, *depressedness*. Again, the evidence suggests a derivation more productive than the affixation available to mark it.

There is a suggestion in the active and passive adjectives that they refer to a completed action rather than a simple state. If Mary is *surprised,* for example, Mary must have been brought into the state of surprise by a completed (perfective) action. If so, however, the perfective sense must be a logical implication rather than the result of a grammatical function added by derivation. The reason is that passive adjectives like those in 18 cannot be derived from participles; the intensifier *very* indicates that they are true QAdjs.[16]

(17) a. *John is very plastered/loaded/ripped/wired/crocked/wasted.*
b. *John is very disaffected/misguided/mistaken.*
c. *John is very introverted/laid back/spaced out/depressed/elated.*
d. *The paragraph is very disjointed/stilted/convoluted.*

The adjectivals in 17 do not imply that the state they represent is the result of prior action denoted by the base of the adjective in order to reach the state to which the adjective refers. Indeed, these passive adjective expressions have no correlate participle with its perfective sense, as 18 demonstrates. (The parenthesized asterisks mark phrases which are ungrammatical in the relevant sense.)

(18) a. **John has been plastered/loaded/ripped/wired/crocked/wasted (by the gin).*
b. *(*)John has been disaffected/misguided/mistaken (by his friends).*
c. **John has been introverted/laid back/spaced out (by his wife).*
d. *(*)The statement has been disjointed/stilted/convoluted (by its author).*

The implication is that, while the adjectives here refer to states related to their bases, those states are not the result of any action denoted by those bases. The derivation of the adjective from the participle is ruled out in these cases.

Under LMBM, the identical affixation shared by the adjective and the participle is explained in terms of the shared passive relation, the linking of the head noun to the object argument of the base verb. The sense of perfective aspect in passive adjectives would seem to be a logical implication of states related to verbal concepts. Exx. 17 and 18 indicate, however, that such states need not result from the activity denoted by the base. The sense of completed action in the passive adjectives hence is not necessarily marked by *-ed* or some other participial marker.

The answer to the second question—why are there active and passive var-

[16] Levin & Rappaport (1986) used only a copulative diagnostic to distinguish their passive adjectives from participles—whether the adjective could occur after the full range of copulative verbs, as in e.g. *the books remained neatly placed along the wall.* This test does not rule out the adjectives of a category called DEFECTIVE ADJECTIVES in Beard 1991b, e.g. *aside, aboard, adrift.* These adjectives are usually prohibited from attributive position (**the aboard/placed book*), do not adverbalize with *-ly* (**aboardly/placedly*), do not nominalize (**aboardness/placedness*), do not compare (**more aboard/placed than ...*), and do not take QAdj intensifiers (**very aboard/placed*). I have chosen to use the properties of QAdjs as the diagnostics of adjectivity because they more accurately define adjectivity than Levin & Rappaport's one diagnostic. Clearly the relation between defective adjectives and QAdjs requires further investigation; until that is done, no account of participial adjectives is complete.

iants of the deverbal adjective transposition?—raises the same semantic issues broached in connection with OPAdjs and OSAdjs in §2. Semantic properties have one-place predicates, e.g. REDNESS{[X]}, the predicate structure of *X is/was/will be red*. Deverbal adjectives, however, may inherit their argument from two-place predicates in the underlying verbs. *Annoy*, for example, has the argument structure ANNOY([X], [Y]). The discussion of SPAdjs and OPAdjs showed how transposition may lexically bind either the subject or the object argument of the two-place predicate POSSESS([X], [Y]) that underlies the grammatical functions, but not both. The V → A transposition presents a similar mismatch, this time between the predicate structure of a verbal base and the adjectival output. Again, transposition lexically selects one argument at a time to assign as the argument of the adjective. If the object argument is selected, the MS-component provides the morphology of the passive adjective, e.g. (*the*) *annoyed* (*person*). If the subject argument is selected, the result is an active adjective, e.g. (*the*) *annoying* (*person*). This account does not appeal to inflectional categories, only to the structures of verb and adjective subcategorization and the pressures they bring to bear on V → A transposition.

The syntactic reasons for postulating subject and object as functional features are by now familiar. Most recently, Chomsky 1992 and Vergnaud & Zubizarreta 1992 have proposed that subject and object are functional categories that are necessary to account for subject and object agreement in many languages. In his VP-internal treatment of subject, Chomsky posits two symmetrical AgrPs (agreement phrases)—AgrS and AgrO—which mediate the relation of NP to verb. Chomsky argues that positing these categories in syntax accounts better not only for subject and object agreement but for differences between accusative and ergative languages as well. Of course, supporters of Lexical Functional Grammar (Bresnan 1982) and Relational Grammar (Perlmutter 1983, 1984) have long argued the same point. There exists, therefore, a substantial body of evidence supporting subject and object as independent grammatical functions. Since functional derivations operate on similar functions, e.g. [+Similar(Y)] and [+Possess(Y)], it is reasonable to conclude that they also operate on [+Subject] and [+Object], as proposed initially in Beard 1981.

Finer constraints also apply language-specifically to these derivations. Brekke 1988, for instance, has discovered that active adjectives are possible in English only for verbs which require an experiencer. An interesting example is the verb *revolt*, which has two meanings, one of which requires an experiencer object; only this one allows the active adjective, e.g. *the peasants are* (*very*) *revolting*. The same dualism is detectable in *absorbing*, *arresting*, *biting*, and *cutting*.

As in the case of OPAdjs and SAdjs, both transpositional and functional means of derivation are available for generating 'participial' adjectives, so both schools of thought are again correct. Indeed, L-derivations with multiple origins seem to be a not uncommon phenomenon which contributes to productivity.

7. IMPLICATIONS. OPAdjs and SAdjs provide useful insight into the workings of lexical derivation and its relation to semantic categories. Both of these QAdjs

may be derived from a single denominal adjectival transposition, varying only in the level at which the semantics of the head links with the Q{[ ]} argument position. If the head fills the position created for the derived adjective as a whole, the implication is that the reference of the base noun underlying the transposed adjective as a whole is a property of the head—the semantic effect of the OPAdj. If, however, the head links with a single property feature of the base noun of the transposition, the result is the semantics of the SAdj. This identity of origin explains why many OPAdjs and SAdjs share the same affixation.

The meanings of OPAdjs and SAdjs may also be explained by the two discrete universal grammatical functions [Possess(Y)] and [Similar(Y)], functions of such cases as the IE genitive and instrumental. We would expect the output of these derivations to be distinguished at the grammatical (as opposed to the semantic) level by affixation, an expectation borne out in the data. But this leads to two legitimate explanations of the origins of OPAdjs and SAdjs: transposition and functional derivation. We might wish to develop some diagnostic to determine which of the two origins explains OPAdjs and SAdjs. However, since both origins are legitimate within the otherwise highly constrained LMBM model, we may also consider the possibility that these two derivations have simultaneous dual origins within a properly defined grammar.

The implication of such a conclusion is that both the proponents of Word Syntax (see §1 above), who argue that the meaning of such derivates comes from the argument structure of the base, and proponents of autonomous morphology, who argue that such derivations are based on morpholexical category functions, are correct. If the derivation is simply one of changing the syntactic category from noun to adjective, the difference between OPAdjs and SAdjs is the manner in which the semantic features of the base compose with those of the head noun. However, such an account does not preclude derivation via grammatical functions under LMBM, since LMBM also predicts functional derivations based on the same functions found in inflection, e.g. locative (*bakery*), instrumental (*stimulant*), manner (*quickly*), and purposive (*writing* as in *writing paper*). In morphologically luxuriant languages like Serbo-Croatian, Chukchi, and Yupik, virtually all the inflectional functions are found among L-derivations. Hence within an LMBM model, both the Word Syntacticians and the autonomous morphologists can be correct.

In defining the boundary between grammatical and semantic categories more explicitly, this article reconfirms the central role of the morphological component in mapping syntax and the lexicon onto phonology and semantics. In order to distinguish SPAdjs like Serbo-Croatian *brat-ov-a noga* '[my] brother's leg' from OPAdjs like *nog-at brat* 'a leggy brother', the grammar has no option but to generate two adjective categories. This is so because [POSSESS([X], [Y])] is a two-place semantic predicate which maps onto the single-place predicate structure of the adjective. The same explanation accounts for the active and passive participial adjectives: *annoying* and *annoyed* map onto different arguments of [ANNOY ([X], [Y])].

This evidence of asymmetry between L-derivation and semantics joins that

of many recent studies which indicate that neither the lexicon nor the syntax maps directly onto phonology or semantics; rather, both the lexicon and the syntax seem to map onto semantics via a complex system of morphological categories and onto phonology via independent rules of allomorphy. Anderson 1992, Aronoff 1992, Carstairs 1987, and Zwicky 1990 have begun to define the abstract and arbitrary morphological categories mediating between syntax and phonology, expanding the tradition of Matthews 1972 and the Latin grammarians in richer contemporary frameworks. This article joins the literature of Generative Semantics, Jackendoff 1990, Beard 1991a, Pustejovsky 1991, and Carrier & Randall 1992 in examining the other side of morphology—the role of morphological categories at the interface of syntax and the lexicon, on the one hand, and semantics and the lexicon on the other. The evidence examined here, therefore, speaks in favor of an autonomous morphological component; indeed, it speaks rather eloquently for the central role of morphology: mapping syntax and the lexicon onto semantics and phonology.

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