"Grammatical Processes" in Sapir's *Language* (1921): From the viewpoint of contemporary morphology [1]

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0. Introduction

This paper reviews Sapir's (1921) morphological analysis for grammatical processes and seeks to show what kind of implication it has for the development of morphological theory. But before going straight to Sapir (1921), I will review the course of development of morphology in Section 1, drawing attention to the fact that there have been many debates on morphology as an independent module of grammar, its place, methodology, and so on.

Section 2 reviews Sapir's grammatical processes and terminology, and criticizes one of his notations. As an exemplification for issues surrounding morphology, I show several phenomena in English and Japanese that can be best captured at the interface of morphology and other domains of grammar.

In Section 3 I will show that morphology is an independent module with many operations at work at the interfaces with syntax and phonology.

1. Development of morphology in theoretical linguistics

There are many questions and alternatives for morphology in the current setting of theoretical linguistics. The first question is whether the domain of morphology is an independent component

[1] This is a modified version of my presentation at the 23rd annual meeting of the Sapir Society of Japan, held at Kwassui Women's College on October 18, 2008. I would like to thank the audience for fruitful discussion, Yasuhiko Kato and late Yoshio Nagashima in particular, for valuable comments. All errors are, needless to say, mine. This work was conducted in memory of Felix Lobo (1926 – 2008), who, in his introductory course, would quote Nietzsche's thesis of "I do not study philosophy (Philosophie); I philosophize (philosophiere) and say "I do not teach linguistics; I teach how to linguisticize." in his introductory course,

of grammar, or is subsumed in other component(s) or module(s). If the answer to this question is the former, then questions follow with respect to the place of morphology within the framework: whether it precedes or follows the syntax, whether it is an indivisible whole or can be further decomposed into several submodules such as derivational and inflectional modules, and so on.

In addition, even if we are unanimous about the above questions, there are still multiple methodological proposals on how to implement the component(s) of morphology.

If, on the other hand, morphology is a part of some other component(s), how can the observed facts be described and explained?

These questions did not arise within the very strict physicalism of the American Structuralist linguistics: as manifested in Bloomfield (1933), the objects of linguistic analysis must be visible or observable elements, and analysis must start from the smallest unit to bigger elements. Thus they started from phonemics, whose minimal unit is a phoneme, defined as "the minimal unit responsible for distinction of meaning." Next step up lie morphemes, which are "the minimal unit bearing meaning." And morphology was defined precisely as the domain of linguistics that dealt with morphemes.

In the 1950s, there was a heated discussion on the way morphological processes such as inflection are carried out. One method is commonly called the "Item and Arrangement (IA)", where all the morphemes are real morphological entities, and inflection is viewed as concatenation of a substantial word and an affix, a verb and a tense morpheme, for example. The other approach, known as the "Item and Process (IP)", assumes that "free morphemes" such as verbs exist as real entities, but "bound morphemes" like {D} of the English past tense are in fact not morphemes but are introduced as symbols in morphological operation of suffixation. In other words, they are mere bi-products of word formation rules. As we will see in Section 3, to this day these two approaches have recurrently emerged in spirit.

With Chomsky's proposal of generative grammar (Chomsky (1957, 1965)), however, the picture changed. He argued for the autonomy of syntax, and proposed the "standard model" of grammar: A set of phrase-structure (PS) rules generate Deep Structure, which undergoes transformations. The derived structure, called Surface Structure, is finally realized as terminal strings by lexical insertion from the lexicon, which is an example of rewriting rules as well. In the course of this theoretical development, the place and status of morphology became less obvious. Since inflectional morphemes such as plural *-s*, present participial *-ing* and past participial *-en* are parts of PS rules and transformations such as affix hopping, it was fairly clear that inflectional

processes are treated syntactically in the "standard model." On the other hand, it was assumed that the lexicon was the storage of idiosyncratic information on each lexical item.

This position was even more robustly manifested in Chomsky (1970). Based on syntactic and semantic differences between derived nominals and gerunds, he proposed a lexical approach to derived nominals. Under this "Lexicalist Hypothesis", word formation is handled within the lexicon. Among them, the most extreme is the "Strong Lexicalist Hypothesis" assuming that all the lexical processes, derivational or inflectional, take place in the Lexicon (DiSciullo and Williams ((1987), Sells (1995), and other LFG/HPSG approaches). On the other hand, there are approaches like Lieber (1992), who tries to handle all the word formation processes in syntax. Similar approaches are taken by works by Baker (1988) and others by means of head movement.

During the 1980s when the Government-and-Binding approach (Chomsky (1981)) was widely assumed, not much mention was made on inflectional morphology except for discussion of the morphological case and the structural Case.

Into the 1990s, as Chomsky developed the Principles-and-Parameters approach and later the Minimalist Program, the above-mentioned two distinct approaches for inflectional morphology were revived in the current setting.

In this theoretical background, it is not surprising that researchers in the field keep on discussing the above issues: Anderson (1982) is among many that address the question of the place of morphology. The same mention is made in Jackendoff (1997):

"There seems to be a recurrent problem about where morphology fits into the theory of grammar — whether it is or it is not distinct from syntax and/or morphology."

(Jackendoff (1997: 110))

2. On Sapir's (1921) "grammatical processes" and terminology

2.1. Grammatical processes

In Sapir (1921: Chapter IV) he discusses "grammatical processes" under which forms in a language are derived. By "grammatical processes" he refers to the formal methods employed by a language. He draws examples from inflection, regular and irregular inflectional processes in English and argues for necessity for two distinctions. The first one is distinction between form and function, and the second one is distinction among processes or operations.

English has regular and irregular nouns with respect to the form of plural. It also has regular and irregular verbs in terms of inflection for tense. As summarized in (1), *reformers* and *geese* are equivalent functionally, so are *died* and *sang*. Yet the grammatical, or morphological processes involved are quite distinct, one being suffixation and the other being vowel change, or umlaut. Hence he argues that process and concept, or form and function, are by no means one-to-one relation and must be distinguished. And a language can employ more than one processes to express a concept. In addition to the two processes listed in (1), English has semi-regular patterns that show subregularities both in nouns and verbs, such as *life/lives* and *wife/wives*, or *drive/drove/driven* and *write/wrote/written*.

(1)

process \ concept	singular → plural	present → past
suffixation	reformer → reformers	die → died
Vowel change (umlaut)	goose → geese	sing → sang

Then Sapir goes on to show "non-concatenative" morphological processes found in Semitic languages. Investigation into these languages in the current setting has led to development of non-linear and non-concatenative phonology and morphology including works by McCarthy and Prince.

At any rate, the above view presented by Sapir is now a widely accepted one in linguistic analysis.

2.2. Issues surrounding Sapir's morphological notations

Although Sapir himself did not use the actual word "morphemes" in Sapir (1921), let us briefly review the standard terminology. Generally, a morpheme is defined as the minimal meaning-bearing unit. The term itself originates in de Courtenay (1895). Depending on whether a morpheme can stand alone by itself or not, it is further classified into "free morphemes" and "bound morphemes."

Sapir (1921: pp. 25-26) gives the following examples:

(2) *sing = A* *sing-er = A + (b)* *(L) hort-us = (A) + (b)*
garden-nominative

He defines *A* (capital letter) as the "radical element", which is a complete and independent word or the fundamental substance. This is equivalent to the so-called root or stem. On the other hand, *b* (small letter) is called the "grammatical element" and is the indicator of a subsidiary and more abstract concept. In other words, this corresponds to the affix. As for parentheses *( )*, it is the symbol of the incapacity of an element to stand alone.

He explains the notational differences between *sing-er* and *hort-us* as follows. First, it is true that both *sing* and *hort* refers to some substantial concept or notion, so they are radical elements, or A. Given that, *sing* can "stand alone" in sentences like *I/You/We/They sing*. Therefore parentheses are unnecessary. On the contrary, in the case of Latin, the stem *hort* never appears by itself despite the fact that it is the "fundamental substance." That is why *hort* requires parentheses. As for *-er* and *-us,* they are instances of *b*, since they are the "indicator of a subsidiary and more abstract concept." And since they are affixes, which must attach to a stem for pronunciation, parentheses are needed. As Spencer (1998) points out, his standpoint of separating processes from functions, and postulating several different processes, is different from concatenative IA approach, and envisions the IP approach.

However, I see two problems with his notation, one hinging on the other. First, although *sing* can appear by itself as Sapir correctly points out, if we think harder, appearance of *sing* in the above contexts is no different from *hort-*: *sing* has multiple usages as in (3):

(3)	a.	I sing.	(first person singular inflection)
	b.	You sing.	(second person singular inflection)
	c.	We sing.	(first person plural inflection)
	d.	You sing.	(second person plural inflection)
	e.	They sing.	(third person plural inflection)
	f.	John saw Bill sing.	(bare form)
	g.	John wants to sing.	(part of the infinitive)

Although they are identical in form, they are different in function. Thus, this is another instance of Sapir's thesis that form and function are not in one-to-one relation. If so, it is natural to assume that there be an invisible abstract element that is phonetically null but nonetheless responsible for these different functions. In fact, (3) is just an accident in the present-day English, and if we

go back to the history of English, the Old English for instance, it has much richer inflectional paradigms for both nouns and verbs:

(4)	a.	Ic singe.	(first person singular inflection)
	b.	Þū singst.	(second person singular inflection)
	c.	Wē singgaþ.	(first person plural inflection)
	d.	Gē singgaþ.	(second person plural inflection)
	e.	Hiē singgaþ.	(third person plural inflection)
	f.	singan	(bare form)
	g.	to singenne.	(part of the infinitive)

Actually, Sapir himself admits that the above analysis does not seem to capture the precise nature of the word *sing*. He notes that "*sing* is a kind of twilight word, trembling between the status of a true radical element and that of a modified word of the type of *singing*" (Sapir (1921: p. 27ff.)). He refers to the history of English, too. It is understandable that within the strict methodological limitation of the American structuralism, under which analysis should be made on observable elements, Sapir could not postulate invisible abstract elements. But at least for English verbal inflection, we have many grounds to posit such elements.

Therefore, if we translate the examples of the present-day English *sing* into Latin, it will be as follows:

(5)

a. +cant-are = *(A) + (b)* 'to sing'
sing sing-infinitive

c. cant-o = *(A) + (b)* 'I sing.'
sing-1.sg.

d. cant-amus = *(A) + (b)* 'We sing.'
sing- 1.pl.

e. cant-as = *(A) + (b)* 'You(sg.) sing.'
sing-2.sg.

f. cant-atis = *(A) + (b)* ' You (pl.) sing.'
sing-2.pl.

g. cant-at = *(A) + (b)* '(s)he sing.'
sing-3.sg.

h. cant-at = *(A) + (b)* 'We sing.'
sing-3.pl

If the above reasoning is correct, then the precise notation of *singer* is not *A + (b)*, but should be *(A) + (b)*.

Now, the conclusion leads to a further question and possible problem. Do we need parenthetical notation at all if we see radical elements this way? As far as verbs, adjectives and even other categories like nouns that have inflection are concerned, possibly all radical elements are "bound" in the above sense, so we may as well do without it. It is all the more plausible if we observe a wide variety of world's languages. With respect to prepositions, adverbs and so on, there seem to be instances where these words are really independent radical elements. So, for instance, English prepositions like of and to do not inflect at all, so can be represented as *A*.[2]

Turning to "grammatical elements", or *b*, the use of parentheses seems redundant. Given Sapir's definition of "grammatical elements", which states that they are affixes in essence, they can never "stand alone." Then, the only possibility where parenthetical notation has distinctive meaning would be the class of "radical elements." But as I just addressed above, its necessity for "radical elements" can also be called into question.

3. Theoretical development of morphology and the lexicon

3.1. IA and IP revisited

In section 1 I overviewed two approaches to inflectional morphology, Item and Arrangement (IA) and Item and Process (IP). Part of the debate seems to reside in how one views the nature of the lexicon. Di Sciullo and Williams (1987) characterized "words" and the lexicon from a different angle. They proposed a notion of "listemes", which cuts across the distinction between free and bound morphemes. Listemes refer to elements that must enter into the lexicon. Under the strong Lexicalist Hypothesis, words are derived within the lexicon, but they make distinction between the "actual lexicon" and the "virtual lexicon." The former refers to the static list of listemes, whereas the latter is the product of word formation in the actual lexicon, which contains not only listemes but also derived words. This approach is in the tradition of IA.

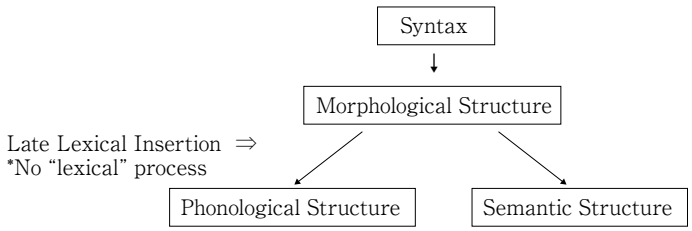
On the contrary, works by Anderson (1992), Aronoff (1994), Beard (1995) are methodologically in the spirit of IP. Details aside, they seem to share the following view on morphemes and the lexicon. First, the "morpheme" in a wide sense is a set of the two different class of elements, "lexemes" and "morphemes" in the narrow sense. The former refers to

[2] Yet in languages like French, the equivalent of *of* is *de*, but if it is followed by the masculine singular definite article *le* they are contracted as *du* and with the plural definite article *les* they become *des*. Likewise, à, the French counterpart of *to*, is also contracted as *au* with *le* and *aux* with *les*. Discussion of this kind of form is far beyond the scope of this paper.

contentful and substantial elements, while the latter covers grammatical formatives and affixes. According to Anderson (1992), lexemes are listed in the lexicon, but morphemes in the narrow sense are actually not real entities but are introduced in the course of application of word formation rules. In other words, they are not in the lexicon but part of the description of rules, and come into existence a morphological bi-products. Their division of lexemes and morphemes corresponds to Sapir's (1921) radical elements and grammatical elements.

In contrast with the above approach, the theory of Distributed Morphology proposed by Halle and Marantz (1993) is reminiscent of IA. They assume that the lexicon consists of vocabulary items that are stems and affixes. And, unlike the Minimalist Program but more like the standard model of Chomsky (1957, 1965), their organization of grammar crucially assumes the late lexical insertion onto the morphological structure derived from the syntax:

(6)



Spencer (1998) also observes that the spirit of phonology and morphology in generative grammar has remained in the tradition of IA, while morphologists dealing with a wider variety of phenomena support the IP view. In the following sections, I will show that both IA and IP approaches are necessary to capture linguistic facts correctly.

3.2. Necessity for dual mechanism

3.2.1. Japanese verbal and adjectival inflections

In the traditional Japanese linguistics, most notably in the works of Shinkichi Hashimoto, classification of Japanese verbal inflection is described in terms of the syllabary (*gojuu-on zu*). For instance, *hasiru* 'run' is classified as *ra-gyoo go-dan katuyoo doosi* (a verb inflecting for five columns on line *ra*). It is so called because the nuclei of inflectional forms range over five vowels and all the forms contain the consonant *r*. However, they classify inflection this way precisely because they analyze forms in terms of syllables. With the American structuralist methodology,

Bloch (1946) proposes a finer analysis where Japanese verbs are classified into regular and irregular verbs, the latter being *ku-ru* 'come' and *su-ru* 'do'. Regular verbs are further divided into consonant verbs, which end with a consonant, and vowel verbs, which end with either /e/ or /i/.

Another advantage of Bloch's analysis is that the non-past forms and past forms of verbs, as well as adjectives, can be treated in a parallel fashion: In Hashimoto's system, the non-past form *hasi-ru* is a simplex word that consists of the verbal stem *hasi* and an inflectional ending *ru*, whereas the past form hasi-t-ta has two morphemes, the verb *hasi-t*, which is the verbal stem *hasi* , followed by a past "auxiliary verb" *ta*. Under Bloch's analysis, *hasir-u* is the stem and the non-past suffix *u*, and *hasit-ta* is the stem and the past suffix *ta*.

Given this analysis, we ask whether these suffixes are listed in the lexicon (IA) or are the bi-products of word formation rules (IP). It turns out that there is a striking paradigmatic relation between verbal and adjectival inflections. (7) is a skeletal table of inflection:

(7)

	vowel V	*tabe-* 'eat'	consonant V	*hasir-* 'run'	adjective	*Aok-* 'blue'
non-past	*r-u* [3]	*tabe-ru*	*u*[+back]	*hasir-u*	*i*[-back]	*ao-i*
conjunctive	Ø	*tabe*	*i*[-back]	*hasir-i*	*u*[+back]	*aok-u*
past	*ta*	*tabe-ta*	*ta*	*hasit-ta*	*at-ta*[4]	*aok-at-ta*

"Suffixes" for non-past and conjunctive forms of consonant verbs and adjectives are all high vowels, in opposition with each other respect to the feature [± back]. This situation can be best captured by a paradigmatic set of word formation rules, rather than isolated specification of suffixes in the lexicon. On the other hand, the past morpheme *-ta* does not seem to be phonologically motivated, and needs to be specified in the lexicon. In other words, while non-past and conjunctive *-u* and *-i* are the bi-products of word formation rules derived in the IP manner, *-ta* is a listemes in the sense of Di Sciullo and Williams (1987) or a vocabulary item according to Halle and Marantz (1993), and concatenated to the verb t the stage of late lexical insertion.

Note that this is semantically well-motivated as well. Cross-linguistically, the form of non-

[3] I assume here that *r* is epenthesized between the vowel ending and non-past *u* to avoid hiatus.

[4] I consider *at-* an allomorph of the Japanese copulative verb *ar-*. It is used in adjectives except for simple present essentially to achieve verbal inflection. See Urushibara (1994a) for discussion.

past has a wider range of usages than other forms, and its meaning is elusive: It is often the case that the non-past form refers to the residue of the tense explicitly denoted by specific morphemes such as past tense morphemes. Therefore, it is natural that the more specific past form is listed in the lexicon and insertion applies for this specific item in accordance with the "elsewhere principle", and that non-past forms are introduced as a kind of default through word formation rules.

One may argue that *-u* and *-i* are not morphological objects, but mere epenthetic vowels to satisfy Japanese syllable constraints: Japanese does not allow codas except for /n/ and geminates (Ito (1986) among others). This conjecture is not legitimate, however, as these vowels appear even in the environment where no phonological requirement for epenthesis is present. Consider complex predicate formation by adding a verb beginning with a vowel. One such example is *-a(w)-u*, whose lexical meaning is 'match', but which adds 'reciprocity' in its grammaticalized meaning. Another is *-ok-u*: Lexically this denotes 'place' or 'put', but its grammaticalized meaning is something like 'do in advance' or 'do in preparation'. As shown in (9), conjunctive *-i* appears even in these cases:

(8) Vowel verbs

a.	kangae-a(w)-u	'think with each other'
	think-reciprocal	
b.	kangae-ok-u	'think in advance'
	think-do in advance	

(9) Consonant verbs

a.	yom-i-a(w)-u	'read with each other'
	read-*i*-reciprocal	
b.	yom-i-ok-u	'read in advance'
	read-*i*-do in advance	

Thus, Japanese verbal and adjectival inflectional paradigm is a case where dual mechanism of IA and IP are at work simultaneously, and there is a division of labor, specific items being handled by IA and general ones by IP.

3.2.2. English past participles

Oku and Urushibara observed some interesting facts about English past participles and developed a hybrid approach in order to explain them (Urushibara (1997a), Oku and Urushibara (2000), among others). VP preposing is a construction where VP is fronted, leaving inflectional elements such as tense, aspect and other auxiliaries:

(10) a. John said he would study linguistics, and study linguistics he did.
b. John said he would be studying linguistics, and studying linguistics he was.
c. John said linguistics would be widely studied, and widely studied it is now.

Now, when this is applied to sentences in the perfect, an interesting thing happens:

(11) John said he would study linguistics, and study/*studied linguistics he has.

An obvious question is where the perfect morpheme *-en* has gone. Furthermore, when it comes to perfect sentences containing irregular verbs, the completely opposite situation is observed:

(12) a. John said he would take the exam, and take the exam he did.
b. John said he would be taking the exam, and taking the exam he was.
c. John said the exam would be taken by students, and taken by students it was.
d. John said he would take the exam, and taken/*take the exam he has.

While (12a-c) show an expected pattern similar to (10), (12d) is in contrast with (11) in that the inflected "perfect" past participle is chosen. The situation is summarized in (13):

(13)

form / type of verb	present participle	past participle	
		passive	perfect
regular verbs	*-ing*	*-en*	Ø
irregular verbs	*-ing*	irregular form	irregular form

In order to solve this puzzle, we proposed a hybrid approach. Namely, the perfect past participle of regular verbs is derived by "a-morphous" word formation at PF under adjacency with the perfect auxiliary *have* (cf. Anderson (1992)). On the contrary, that of irregular verbs

is stored in the lexicon and inserted at MS-PF by the vocabulary insertion rule (cf. Halle and Marantz (1993)). In other words, regular past participles are not listed in the lexicon as listemes, while irregular ones are. Just as in the case of the Japanese inflectional paradigm we saw in 3.2.1., application of vocabulary insertion rule is done in an "elsewhere" fashion, so the more specific item, in this case the irregular form, is chosen prior to formation of the regular form. Just to complete the picture, the present participle per se is not listed in the actual lexicon as a listeme, as it is completely regular. Whether *-ing* is a listeme or a bi-product of a word formation is an open question whose answer does not concern us here. If-*ing* is listed in the actual lexicon as a listeme, then present participles are derived in an IA fashion and enter into the virtual lexicon. If not, they are derived by a word formation rule.

Also note in passing that there is no contrast between regular and irregular verbs in the case of passives. It seems likely that this difference is due to the fact that while the aspect of perfect is not relevant to the argument structure of verbs, passivization involves change in argument structure (see, for example, discussion by Baker, Johnson and Roberts (1989) and Grimshaw (1990)). Because of this, it is conceivable that past participles for passives are derived in the earlier stage of derivation and undergo syntactic operations such as VP proposing observed above.

This analysis raises a question on the locus of the meaning of perfect. Urushibara (1997a) argued that it is carried solely by *have*. In many constructions like prenominal and postnominal modification, participial constructions, absolutive constructions, present participles and past participles meaning "passive" can appear by themselves, but "perfect" past participles cannot:

(14) a. Abusing parents tend to have similar experiences in their childhood.
b. Abused children suffer from PTSD.
c. * Abused parents often regret what they did to their children afterwards.

(15) a. Children abusing computer games cannot concentrate on study.
b. Children abused by their parents suffer from PTSD.
c. * Children abused computer games cannot concentrate on study.

(16) a. Using a spell-checker, John can now submit typo-free papers.
b. Used by many people, the spell-checker proved to be convenient.
c. * Used the spell-checker, John was able to submit typo-free papers.

(17) a. John taking care of their children, Mary can go on a business trip.

b. Their children taken care of by John, Mary can go on a business trip.
c. * John taken care of their children, Mary was able to go on a business trip.

Probably for the argument-structural reasons mentioned above, the past participle bears the meaning of the passive, but not that of the perfect. The perfect meaning then must reside in the perfect auxiliary *have*. *-en* for regular perfect participles is a mere morphological bi-product, and even irregular perfect participles are the result of late lexical insertion.

One final twist is that there is a contrast between transitive and accusative verbs in interpreting the perfect past participle. As shown in the weak contrast between (18c) and (19c), the meaning of perfect is permeable to the past participle if the verb is unaccusative:

(18) a. Children abusing cats were punished.
b. Children abused by parents were rescued by the police.
c. * Children abused computer games ended up being underachievers.
(19) a. Trains carrying passengers were attacked by terrorists.
b. Trains pulled by the steam engine arrived at the station.
c. (?) Trains arrived from Paris brought in many tourists.

The same is pointed out in Grimshaw (1990) from an argument-structural viewpoint.

(20) a. fallen leaves (Grimshaw (1990: 182))
b. elapsed time

I leave this problem for further research.

3.3. Phonological processes and morphological processes

In Sapir (1921: p.62) he discusses the phonological processes of assimilation and morphological derivation. Using familiar examples like *books* [s] versus *bags* [z], he argues that this alternation has no inherent [morphological: su] functional value or significance. On the contrary, when voicing changes the category of radical elements as in *house* [s] (noun) to *house* [z] (verb), an important grammatical function is changed. Therefore they are entirely different processes.

However, there are many cases where phonological and morphological processes interact with each other. In other words, the shape of the phonological word is not always a mere amalgamation or summation of morphemes that are combined one way or another. One such example comes from some Japanese complex predicate formation, which suggests that the phonological structure has an access to the lexicon and syntax. Consider the following. It is well-known that Japanese derivational morphemes such as *-soo-da* 'be likely to' and *-sugi-ru* 'too much' attach to verbal stems, adjectival stems and "adjectival nouns", or the stems of so-called *keiyoo-doosi* "adjectival verbs":

(21) Verbal stems

a. tabe-soo-da 'be likely to eat'
eat-likely to be

b. tabe-sugi-ru 'eat too much'
eat-too much

c. yom-i-soo-da 'be likely to read'
read-likely to be

d. yom-isugi-ru 'read too much'
read-too much

(22) Adjectival stems

a. samu-soo-da 'be likely to be cold'
cold-likely to be

b. some-sugi-ru 'too cold'
cold-too much

c. kanasi-soo-da 'be likely to be sad'
sad-likely to be

d. kanasi-sugi-ru 'too sad'
sad-too much

(23) Adjectival nouns

a. sizuka-soo-da 'be likely to be quiet'
quiet-likely to be

b. sizuka-sugi-ru 'too quiet'
quiet-too much

c. genki-soo-da 'be likely to be active'
active-likely to be

d. genki-sugi-ru 'too active'
active-too much

Now, when these suffixes attach to stems that have only one mora, they behave differently between verbal and adjectival stems[5].

[5] There are only a limited number of adjectives and adjectival verbs whose stems are one mora. While adjectives *yo-i* 'good' and *na-i* 'nonexistent' are basic adjectives and are frequently used, an adjectival verb *i-de ar-u* 'strange' is quite obsolete and is used only as fixed or fossilized expressions such as *i-na koto(-de ar-u/da/ja)* strange thing(-copula) 'It is strange.' Therefore I do not include this in examples.

(24) One-mora verbal stems

a. ki-soo-da/*ki-sa-soo-da ‘be likely to wear’
wear-likely to be/ wear-*sa*-likely to be

b. ki-sugi-ru/*ki-sa-sugi-ru ‘wear too much’
wear-too much/wear-*sa*-too much

c. mi-soo-da/*mi-sa-soo-da ‘be likely to watch’
watch-likely to be/watch -*sa*-likely to be

d. mi-sugi-ru/*mi-sa-sugi-ru ‘watch too much’
watch-too much/watch-*sa*-too much

(25) One-mora adjectival stems

a. *na-soo-da/na-sa-soo-da ‘be likely to be nonexistent’
nonexistent-likely to be/ nonexistent-*sa*-likely to be

b. *na-sugi-ru/na-sa-sugi-ru ‘nonexistent to the extreme’
nonexistent-too much/nonexistent-*sa*-too much

c. *yo-soo-da/yo-sa-soo-da ‘be likely to be good’
good-likely to be/ good-*sa*-likely to be

d. yo-sugi-ru/(?)yo-sa-sugi-ru ‘too good’
good-too much/good-*sa*-too much

Appearance of -*sa* in the examples in (25) is quite unexpected[6]. As is paradigmatically obvious, -*sa* her does not play any semantic role. Thus the reason for this appearance must be sought for in the other domains of grammar, and I argue that this is due to a phonological constraint on the minimal word.

Let us assume here that phonological words of the languages of the world must satisfy a requirement that they have certain number of phonological units (see works by McCarthy and Prince, Ito and Mester, among many others). Formally stated as the “Minimal Word Constraint”, the size is parameterized and the value is either bi-moraic or bi-syllabic. Many pieces of evidence show that the Japanese minimal word has to be bi-moraic.

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[6] In contrast with the paradigm in (25a, b) and (25c), the pattern without -*sa* is acceptable and the one with -*sa* is slightly degraded. This is not what we would expect. As pointed out in footnote 5, the number of one-mora adjectival stems are so small that it is hard to examine a wider range of data and capture generalization.

Given this constraint, the above data indicate three things. First, no matter whether this derivation takes place within the lexicon or in syntax, the phonological component can cursor the internal structure of these complex predicates and can calculate the number of morae per domain. Otherwise, the whole chunk should be taken as a word and it should obviously fulfill the Minimal Word Constraint. Thus, even after the complex predicate has been formed, somehow adjectives and the derivational suffixes form two separate domains. In the phonological component, some repair strategies has to be executed in order to save this derivation. Although the primary function of *-sa* is nominalization of adjectives and adjectival verbs, it seems to be quite "versatile" given that *-sa* appears in adverbial clauses and exclamatives. From the perspective of phonological weight and categorial selection, it is the lightest to save the derivation, and meets the selectional properties. Thus it seems reasonable to postulate a strategy that is operated in the phonological component in which *-sa* is inserted after the one-mora adjectival stems.

The second point concerns why such insertion does not take place with one-mora verbal stems. There are two possibilities. One is that although verbal stems and the above suffixes do keep two separate domains just as adjectival stems and those suffixes do, *-sa* cannot be used as a rescue strategy because of categorial selection: *-sa* categorially selects stems of adjectives and adjectival verbs, but not those of verbs (or nouns).

The other possibility is that there is a difference between adjectives and verbs in the way these complex predicates are formed: While adjectives do not form a single domain with the suffixes, verbs do. Then in the case of verbs the whole complex counts as the phonological word constraint, nullifying the need for *-sa* insertion.

The following set of data seems to support this second possibility. The adjective *-nai* has three usages. One is a usage as a free morpheme meaning 'nonexistent', which we just saw above. Another is also a usage as a free morpheme, but in this case it is used as a negation marker for clauses with nonverbal predicates (nouns, adjectives, adjectival verbs and postpositional phrases). The other usage is a negation maker for verbs, but in this case it behaves as a bound morpheme.

When *-soo-da* and *-sugi-ru* are attached to these cases, they behave differently depending on the usage of *nai*. First, *nai* as the free morpheme requires *-sa,* no matter whether it means 'nonexistent' or a negation marker. This is expected if we assume that it constitutes its own phonological domain:

(26) (= (25a, b))

a. *na-soo-da/na-sa-soo-da ‘be likely to be nonexistent’
nonexistent-likely to be/ nonexistent-*sa*-likely to be

b. *na-sugi-ru/na-sa-sugi-ru ‘nonexistent to the extreme’
nonexistent-too much/nonexistent-*sa*-too much

(27)

a. *samuku na-soo-da/na-sa-soo-da ‘be likely not to be cold’
cold neg-likely to be/ neg-*sa*-likely to be

b. *samuku na-sugi-ru/na-sa-sugi-ru ‘not cold to the extreme’
cold neg-too much/neg-*sa*-too much

However, when it comes to the bound-morpheme usage of *-nai*, insertion of *-sa* seems to be optional at best:

(28) a. tabe-na-soo-da/tabe-na-sa-sooda ‘be likely not to eat’
Eat-neg-be likely/eat-neg-*sa*-likely

b. tabe-na-sugi-ru/tabe-na-sa-sugi-ru ‘do not eat too much/eat few’
eat-neg-too much/eat-neg-*sa*-too much

The fact that *-sa* is not required seems to indicate that in (28) one phonological domain has een created, either by syntactic head movement or morphological merger or some other means.

A further set of data indicate that even within the lexicon, complex adjectives with *-nai* and *-yoi* nonetheless do not create one phonological domain. In (29) and (30), *-sa* is required even though these complex predicates are quite lexically idiosyncratic[7]:

(29) a. *ikuzi-na-soo-da/na-sa-soo-da ‘be likely to be timid’
gut-nonexistent-likely to be/ nonexistent-*sa*-likely to be

b. *ikuzi-na-sugi-ru/na-sa-sugi-ru ‘not cold to the extreme’
gut-nonexistent-too much/nonexistent-*sa*-too much

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[7] These expressions have idiomatic counterparts where *ikuzi* ‘gut’ and *kokoti* ‘feeling’ are not incorporated. In those cases *-nai* donates ‘nonexistent’, which is why they are glossed as such in these examples. In terms of appearance of *-sa*, however, they behave the same way as (27).

(30) c. *kokoti-yo-soo-da/yo-sa-soo-da 'be likely to be comfortable'
feeling-good-likely to be/ good-*sa*-likely to be
d. kokoti-yo-sugi-ru/(?)yo-sa-sugi-ru 'too comfortable'
feeling-good-too much/good-*sa*-too much

All in all, in order to compute the integrity as a phonological word, the phonological component must have an access to category. However, such categorial information seems unavailable under the late lexical insertion. One may as well adopt Jackendoff's (1997) proposal of Phonological Interface Level (PIL) and Conceptual Interface Level (CIL) at the level of S-structure, or at the end of derivation.

Finally, just to emphasize the ubiquitous nature of -*sa*, consider the following. In Tokyo dialect, phrases like (31) are NPs, a nominalization of an adjective, and it refers to the degree of the adjective at hand. In Saga dialect of Japanese, however, this is ambiguous: In addition to the standard meaning of degree, it can be interpreted as exclamatives. In other words, this is an instance of -*sa* entering syntax:

(31) a.	Yama-no taka-sa	'height of a mountain'	(Tokyo dialect)
	Mountain-gen high-sa	'How high the mountain is!'	(Saga dialect)
b.	Umi-no fuka-sa	'depth of an ocean'	(Tokyo dialect)
	sea-gen deep-sa	'How deep is the ocean!'	(Saga dialect)

In addition, Kageyama (1993) and Urushibara (1994b) observe that in somewhat formal and archaic style, -*sa*-attached adjectives serve as the main predicate of an adjunct phrase expressing reason. Interestingly, the arguments within the adjunct phrase bear sentential cases such as nominative and accusative:

(32) Taroo-wa [eiga-ga/o mi-ta-sa]-ni jugyoo-o sabot-ta.
Taroo-top movie-nom/acc see-want-*sa*]-dat class-acc cut-[past]
'Taroo cut the class because he wanted to see a movie.'

This indicates that -*sa* can be inserted in the syntax after other morphological derivational processes. Still, as Urushibara (1994b) points out, categorial selection, which is even tighter in

this case than usual nominalization with *-sa,* is in operation:

(33) Taroo-wa [oki-ru-no-ga mendoo-kusa-sa/*mendoo-sa]-ni
Taroo-top get up-[-past]-nominalizer-nom trouble-stinky-*sa*/troublesome-*sa*]-dat
jugyoo-o sabot-ta.
class-acc cut-[past]
'Taroo cut the class because it was troublesome to get up.'

In usual nominalization, *-sa* can attach to both adjectives and adjectival nouns, as we saw above. But when it comes to constructions like (32) and (33), only adjectives undergo this kind of suffixation.

4. Conclusion

As we have seen, Sapir's discussion of grammatical processes is a root of a very important theoretical proposal. And his distinction between processes and concepts, or form and function has been inherited to the current theory of grammar explicitly or implicitly, to the domain of morphology in particular.

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