

# Isomorphism and Monotonicity: Or the Disease Model of Morphology<sup>1</sup>

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I entered graduate school twenty-five years ago, and in 1970 a conference of this sort would have been unthinkable. There were fewer than a dozen people in generative linguistics who had enough to say about morphology to warrant spending an entire weekend arguing about it. And if some of the papers I have heard this weekend are on target, 25 years from now, such a conference will be equally unthinkable. You won't have any morphologists to kick around anymore. Savor the moment.

More seriously, I am here to try to tie everything together. A colleague of mine asked me what I was going to talk about at this conference, and when I described my role, he said, "Ah, you are to be the

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<sup>1</sup> In this work, I am more indebted than usual to other people; first, to Steve Lapointe, who organized the conference — a weekend in morphological paradise; and second, the Bhavani Saravanan, with whom I have happily talked about Tamil morphology for several years. The data is hers and the analysis comes out of these conversations.

elder statesman." Statesman, I hope; elder or elderly, I hope not. So, first of all, I am not going to include all the papers and responses in my remarks. In fact, I will try to mention as few of them as I can directly.

Let me start with some comments on methodology. At this meeting, we have seen two strikingly different ways of approaching morphology. The first strategy has been to use the tools that one has — those developed in the study mostly of syntax and phonology. From a practical point of view, this is eminently sensible, very American. But it has two serious flaws that I would just like to point out very briefly. First, as Stephen Anderson has noted in several places (Anderson 1992, 1993), and as in fact Andrew Spencer reminds me I also have emphasized recently (Aronoff 1994), there is what we call the "drunk under the lamppost problem". So, if we only look where the light is, we're limiting our search to what we already know, and this may prevent us from actually discovering the truth.

The second problem with this use-the-tools-that-you-already-have approach is less frequently remarked on, and hence more important, and that is what I call the Kripkean problem, which is that we call many notions syntactic or phonological because they were developed in the study of syntax or phonology, and not necessarily because they have any inherent ties to that phenomenological domain, in the physicist's sense of *phenomenology*,

and not the philosopher's sense. For example, the notion of thematic role — I think it's a very dramatic example — lies very clearly within the field of conceptual semantics. Yet, because it was developed by syntacticians, and because it has been used by syntacticians for so long, it has become somehow syntacticized. Even the most autonomous of syntacticians will trade in thematic structures, though they are always careful to say "theta" rather than "thematic", and they don't worry about this miscegenation of levels or components. I think that similar things can happen for example with optimality theory, where there's nothing about optimality as a formalism that has anything to do with phonology, and yet, because it was developed for the study of phonology, we tend to think that it's phonology. And so when we find this miscegenation with morphology, well, that's just a caveat.

The other strategy that we have seen at this conference is almost the opposite, and that is to look precisely for those things in morphology that other subdisciplines don't seem to cover properly. This has been my own method for many years, and its flaws are also very well known. The major flaw of course is that it is somehow perverse — we have all these tools, so why not use them? I won't respond to that. In the end, I think that the choice between methodologies is almost purely aesthetic. As my mother used to say, "Whatever turns you on." I will always rankle when

someone triumphantly announces that their theory of syntax or phonology can account for 90% of morphology. Other people will always wonder why I am so worried about that last 10%. I also believe quite strongly that we need both kinds of people, what the biologists call the lumpers and the splitters (though I can't help but note that the most avid of lumpers are equally avid splitters when it comes to the relation between language and general cognition).

So much for methodology. My remaining remarks will be thematic, though in a different sense from that of thematic role. When I read all of the papers and the responses, I noticed a common thread which runs through most of them, which is the question of isomorphism, so that's what I would like to talk about. This is a very old problem in linguistics, dating back at least to Jakobson's time. For Jakobson, isomorphism was a key to unlocking the inner structure of language. But for Jakobson, isomorphism was tied to the "substance" of language. So, for example, along with Russian psychologists like Luria, Jakobson was very interested in synesthesia, which they regarded as a key to the inner structure of the senses. Similarly, Jakobson would have said that the connection between vowel height and the expression of size tells about the essence of humanity. But this is in a way that no longer resonates for us, because he was interested in substance, in the inner substance of human nature. We're more

interested in the more purely formal or structural aspects of language or human nature. Substantive universals have held very little charm for us since at least the days of *Aspects*.

Most recently, isomorphism has been important in the study of autonomy, and the idea has been that to the extent that two systems seem to be isomorphic or not, then we can see them as related or not. The classic example of this is the argument over the autonomy of syntax from semantics — this is Chomsky's work from the mid seventies (Chomsky 1977). He argued that to the extent that syntactic structures are not isomorphic with semantic structures, syntax can be said to be autonomous. The connection between morphology and isomorphism or nonisomorphism is at first glance parallel to that of syntax. So, to the extent that morphology is not isomorphic with syntax or semantics or phonology, we can say that it is autonomous. This has been a major theme of much work in pure morphology over the last decade, including most of my own.

But, there is in fact a deeper connection here between morphology and nonisomorphism, and that is that morphology is inherently unnatural. It's a disease, a pathology of language. This fact is demonstrated very simply by the fact that there are languages, though not very many, that manage without it — you don't need morphology — and by the perhaps more widely recognized fact that some languages like West Greenlandic or

Navajo have morphology much worse than others do. I think it's clear that the notion of morphologization or grammaticalization is rooted in this disease view of morphology as being inherently unnatural, as is also Sapir's view of language, read *morphology*, as a collective art. Morphology, or grammar, is to a great extent not isomorphic, that's what makes it morphology, or as Saussure would have said, arbitrary. It seems to me that the connection between morphology and unnaturalism is dramatically illustrated in the study of juncture, which is what I'm going to talk about. Since Sapir, who attributed this observation to Bloomfield, linguists have felt that there should be an intimate tie between the closeness of the phonological juncture and the hierarchical standing of the constituents whose boundaries that juncture marks: juncture should increase monotonically with the hierarchy of syntactic constituents. One could argue from the punctuation system of the Hebrew Bible that the Masoretes believed this (Aronoff 1985, Drescher 1994), and the American structuralists certainly operated as if it were true (Hockett 1950).

If juncture strength truly does increase monotonically with constituent structure, then phonological structure is syntactic structure, in some real sense, and morphology can be dispensed with. But, the problem, as some of us have emphasized for many years, is that very often that is not true. Levels are not always ordered nor are they paralleled by constituent

strength. A language may apparently have  $n$  sets of structural types, where  $n$  ranges quite widely — and if you want to see a large  $n$ , see Stanley's work on Navajo juncture, which involved twelve juncture types (Stanley 1973). This is interestingly parallel to the number of inflectional classes that a language can have, which varies for nominals from one, which is of course the minimum, to about 25 in some Arapeshan dialects (Foley 1986, Aronoff 1994, Dobrin 1995). The point is that a language in its natural state, a non-diseased language, will show isomorphism between juncture and syntactic structure. This is demonstrated by the fact that we can order junctures monotonically in terms of their strength, and furthermore, we can even give them names, like 'morpheme boundary' and 'word boundary'. But that is only true of untainted languages. My observation, which is only about diseased languages, that is to say most languages, is that this order is not usually isomorphic with syntactic structure. So, not all morphological boundaries occur where they should from a syntactic point of view.

I will very quickly go through some data from Tamil that demonstrate this. The basic observation is that you can see two types of junctures in Tamil words — I am using the term 'juncture' just to be as atheoretical as I can — which are revealed in facts about voicing. In the close juncture, you get voicing across the juncture, which is what you find within morphemes: voiced stops appear more or less intervocalically, and

the only way you can get voiceless stops intervocalically is if they are geminated. Voiceless stops also appear morpheme-initially. Tamil inflectional morphology follows this pattern. Like all Dravidian languages, Tamil inflection is entirely suffixal. A typical suffix is given in 1:

- (1)    vaar    'live'    + -kɛ    -->  
          vaarɛ    'live long' (blessing)  
          jɛ.ɪd    'write'    + -kɛ    -->  
          jɛ.ɪdɪɛ    '(please) write'  
          kəɪd    'consider'+ -kɛ    -->  
          kəɪdɪɛ    'consider this'

In 1, we have an inflectional suffix, *-kɛ*, which is an imperative or hortative. The initial stop of this particular *-kɛ* suffix voices — you can see it after a retroflex, and you can see that after a stem-final *d* you get the voiced stop with an epenthetic vowel inserted. The inflectional suffix in 2, which is the plural marker in nouns, also shows voicing:

- (2)    aaŋ    'man'    + -kəŋ    -->  
          aaŋgəŋ    'men'  
          tʊŋɪ    'cloth'    + -kəŋ    -->  
          tʊŋɪgəŋ    'cloths'



The inflectional suffixes, so far as I can tell, all have weak juncture. Many derivational suffixes show this same weak juncture, as shown in 3 and 4:

- (3)    seɟ     'do'    +-tɪ    -->  
         seɟdɪ   'news'  
         məɾə   'forget' +-tɪ    -->  
         məɾədɪ 'forgetfulness'  
         pəɟu    'divide' +-tɪ    -->  
         pəɟudɪ 'division'
- (4)    pən                +-pɪ    -->  
         pənbi    'good manners'  
         an                +-pɪ    -->  
         anbi    'affection'

But some derivational suffixes, instead of being voiced at the juncture, are in fact voiceless. So you get a [k] suffix-initially in 5 and 6:

- (5)    vaɑɪ    'live'    +-ke    -->  
         vaɑɪke                'life'  
         vaɪɪ    'slip'    +-ke    -->  
         vaɪɪkke 'bald'
- (6)    vaɑɪ    'live'    +-tɪ    -->  
         vaɑɪtɪ                a greeting

kərid	'consider'	+-ti	-->
kəritti	'opinion'		
jerid	'write'	+-ti	-->
jeritti	'written work/script'		

Note that the suffix in 5 is phonologically identical to the suffix in 1, but shows no voicing, so that the two form a minimal pair of sorts. Note also that voiceless stops appear geminated intervocally; when the stem ends in a sonorant rather than a vowel, there is no gemination, which is most likely attributed to the phonology of codas: the combination of the sonorant and the geminate would produce an overlong coda.

The contrast in the language between the two sets of derivational suffixes, those like the ones in 3 and 4 which show a weak juncture and those like the ones in 5 and 6 which show a stronger juncture, is not echoed semantically or syntactically: both sets pattern alike in that domain. Stepping back a little bit, since derivation is syntactically internal to inflection, what we expect from syntax, in the absence of morphological disease, is that all derivational suffixes will show a weak boundary and inflectional suffixes a stronger boundary. Such would be the case in a healthy language. In fact, most inflectional suffixes in the language show the weak boundary and the derivational suffixes are divided. That is why we say that the situation is pathological. Morphology destroys the

isomorphism between syntax and phonology that we expect to find in a healthy language.

You might be tempted to say to yourself, "Well, maybe our syntax is wrong." So maybe syntactically in Tamil for whatever reasons, the derivational system operates outside the inflectional system, and so therefore we would expect a stronger juncture with derivational suffixes than we do with inflectional suffixes. But the two in 3 and 4 show the weak juncture at the boundary, which means that the problem is not a syntactic one. Indeed, just as in English, some derivational suffixes are variable, with some words in that suffix showing voicing and others not, as in 7:

- (7)    pəŋ    +-paari -->    pəŋbaari        'culture'  
         jɛɛr    +-paari -->    jɛɛrpaari        'arrangement'

I will now turn to compounds, which pattern as we expect. Externally, in relation to inflection, compounds pattern normally: compounds whose members are both otherwise free show a strong juncture — as opposed, incidentally, to the weak juncture in inflection. I should note in passing that this statistically altogether normal pattern of compounds showing a strong juncture regardless of the juncture shown in inflection is a puzzle for syntactically based theories of juncture. Internally, looking only at compounds, there is a difference between free and bound

stems. The stem in 8 is bound and does not occur freely by itself in the language.<sup>2</sup> With such bound stems you get voicing, as 8 shows:

- (8)    *maa*    'mango' +-*kaa*    'vegetable'    -->  
           *maangaa*            'unripe mango'
- maa*    'mango' +-*mərəm* 'tree'    -->  
           *maamərəm*            'mango tree'
- maa*    'mango' +-*jələ*    'leaf'    -->  
           *maavele*            'mango leaf'

When you look at free stems, you get the voiceless stop showing up inside compounds. So because you can say *vaare* all by itself to say 'banana plant', then in *vaarekka* (which literally means 'banana vegetable', because the unripe fruit is used as a vegetable, the suffix is voiceless *-kka* in contrast to the *-ga* in the word for 'mango' in 8 (*maanga*). There is also no linking consonant of the sort that is found with the *maa* compounds in 8. Compounds with *vaare* exactly parallel to those in 8 are shown in 9, and they show strong rather than weak juncture:

- (9)    *vaare*    'banana' +-*pərəm*            -->  
           *vaarepparam*            'banana fruit'
- vaare*    'banana' +-*jələ*    'leaf'    -->  
           *vaarejələ*            'banana leaf'

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<sup>2</sup> The [n] in *maanga* 'mango' is one of these empty linking morphs that one finds in classical Greek compounds and Germanic compounds.

The pattern shown in 9 is normal in the language. Most compounds are formed on free stems and show strong juncture. What's most important about the contrast between 8 and 9 is that it too is normal, but cross-linguistically. We expect to get closer juncture when there is a bound stem because the structural syntactic and semantic connection there is closer and because the stem doesn't occur by itself; it only shows up in these lexicalized forms. Whereas with stems which are not inherently bound, we expect to find the more open juncture.

Why is this important? It's important because this normal case shows you that there is in fact a hierarchy of juncture strengths. We can order juncture strengths in terms of the phonological connection between the elements. The strength of the junctures is monotonic in some sense, but the function from juncture strengths to syntactic constituency is not monotonic. So we know what it means to increase juncture strength. We can perhaps even measure that. But, if you map that index of juncture strength against syntactic structure it goes up and down. That's what morphology is; it's an unnatural mapping between components.

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