Vive la différence![*]
What morphology is about

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What is morphology? What is part of it and what is not? Our contention is that these two questions are really one and the same. While it is true that the discovery procedures designed in the 40's and 50's to identify morphemes were fairly disconnected from theory, it seems only fair that a definition of morphology should be somewhat helpful in determining where it begins and where it ends. Whereas most linguists seem to believe that morphology is about similarities and 'recurring partials, we shall explore the idea, aphoristically advanced in Ford and Singh 1991, Ford, Singh, and Martohardjono 1997, and Singh 1999, that it is actually about systematic exploitation of difference or contrast in I-lexica. In other words, we intend to show that a proper focus on difference (rather than on similarity) can help morphology get rid of problems it seems to have created for itself by going after the identification and segmentation of 'similar partials'.

1. Traditional view

The very notion of a morpheme springs from the observation that words show recurring similar elements and, while some recent theories of more-or-less-word-based morphology have challenged traditional compositional views, most seem to operate under the same assumption that morphological relatedness has something to do with similarity. Anderson (1992; 48) best exemplifies this belief when he describes the goals of morphological theory as follows:

> The basic fact which a theory of word structure must account for is the observation that complex words show partial phonemic/semantic resemblances to one another. Thus *unreasonable-ness* resembles *red-ness*, *un-reasonable* resembles *un-true*, *reason-able* resembles *break-able*, etc.

In recent literature, it is hard, if not impossible, to find any well-defined criterion on the basis of which morphological relations could be identified; one has to go back to structuralism and beyond to find parameters used to discover morphemes. As morphemes are defined as recurring elements of form and meaning, it should come as no surprise that these parameters focused on formal and semantic similarities between words. The "two-way" comparison used by Russian linguists of the late 19th century roughly stated that a morpheme could be identified if it appeared independently or was found with the same shade of meaning in other

words of the language. Half a century later, Nida (1949: 6) introduces his discovery procedures with the following statement:

> "In order to identify the morphemes, we must have certain partially similar forms in which we can recognize recurring partials."

2. Problem

This focus on similarity is, evidently, not entirely unjustified, for morphologically related words do share some form and meaning. Yet it should be obvious that phonemic or semantic resemblance is not equivalent to morphological relatedness. The English words *baseball* and *backgammon,* for example, although not morphologically related, both denote a type of game and share an initial /b/. Nonetheless, the more two words look alike, the more likely it is that their resemblance will be attributed to morphology and in the absence of any useful guidelines to circumscribe the domain of morphology, current theories not only differ in their analysis of morphological relations, but also apply these analyses to radically different phenomena.

In defining his discovery procedures, Nida (1949) expended a great deal of effort to avoid giving the first two consonants in *gleam*, *glow* and *glitter* any morphological status, yet Firthian creatures like *gl-* and *fl-* still find their way into morphological theories in one form or another: Amritavalli (1999), for example, although apparently not satisfied with the term phonestheme, finds the *st-* of *stable*$_A$ and *stability*$_N$ quite worthy of morphological interest and suggests that it belongs to a class of entities she calls "shapers". If one believes that morphology is a game of similarity, there is nothing particularly wrong with such an analysis, nor is there anything wrong with postulating a vegetable *–ato* morpheme in *potato* or *tomato* or a dairy morpheme in *cheese* and *cheddar*. Most would reject such a morphemic break-up on the basis that *–eese* and *–eddar* never show up anywhere else in the language with the same meaning; yet even Nida's arguments against a *gl-* morpheme do not extend to small English fruits and despite it's total unproductiveness, that pesky little *cran-* morpheme still has a place in most recent theories of morphology. In a componential model, an analysis based on similarity will undoubtedly force one to deal with morphological leftovers like *cran*. Even Anderson (1992), who is quite comfortable relating *dog* to *dogs* without the help of non-phonic internal structure, deems it necessary to imprison the *berry* in

cranberry between two brackets, as if these two words could not look alike without the blessings of morphology.

This fascination with similarity can even reach beyond recurrences of form and meaning. Following in Robins' (1959) footsteps, Bender (1998) suggests a model of word-based morphology in which morphemes are units of form and grammatical properties. In Bender's view, however, the grammatical properties carried by these "recurring similar elements" are rather ethereal, and a morpheme merely serves as sort of *aide-mémoire,* or "helper", in identifying the part of speech a given word belongs to. Unfortunately, these "helpers" are not really good at their job: the -er in English does not quite fulfil its heuristic function of reminding us that words ending in it are likely to be nouns (cf. *teacher*$_N$, *wander*$_V$, *taller*$_{Adj}$ and *spider*$_N$,).

3. Focus on difference rather than similarity
The idea that contrast, or difference, plays a central role in language is by no means a new one, as pointed out by Saussure (1916).

(11) [...] la langue est un système dont tous les termes sont solidaires et où la valeur de l'un ne résulte que de la présence simultanée des autres, selon le schéma: (159)[i]

Si la partie conceptuelle est constituée uniquement par des rapports et des différences avec les autres termes de la langue, on peut en dire autant de sa partie matérielle. Ce qui importe dans le mot, ce n'est pas le son lui-même, mais les différences phoniques qui permettent de distinguer ce mot de tous les autres, car ce sont elles qui portent la signification. (163)[ii]

Saussure's point is quite simple, words are defined by the differences that exist amongst them. What we wish to suggest is that some of these differences are found more than once in a lexicon and can be exploited by the speaker to retrieve or create lexical items. If we assume that these differences alone constitute the domain of morphology, the enrichment of lexica becomes not only the *raison d'être* of morphology but also the central issue of morphological theory. This idea can be summed up in a simple definition of a morphological relation:

(12) *Two words of a lexicon L are morphologically related if they differ in exactly the same way as two other words of L.*

In other words, given four words w_{1-4}, w_1 is said to be morphologically related to w_2 if all and only the formal, semantic[iii] and grammatical properties that make them distinct also differentiate w_3 and w_4. Thus, what makes English words like *completely* and *directly* interesting is not the fact that they look alike (by virtue of sharing *–ly*), but the fact that the difference between *complete*$_{Adj}$ and *completely*$_{Adv}$ is exactly the same as that between *direct*$_{Adj}$ and *directly*$_{Adv}$. The presence of the segment */ly/* at the end of the word *directly*$_{Adv}$ is no more relevant in this view than the absence of it at the end of *direct*$_{Adj}$. It is the differential relation between the two that pertains to morphology.

It is easy to see that this conception of morphology is set one degree of abstraction higher than most: it involves four words, not two, and focuses not on the comparison of words, but on the comparison of relations between words. It also treats every aspect of a word (semantic, formal and grammatical) on par, rather than privileging formal and semantic (or formal and grammatical) properties.

Perhaps most importantly, the definition of a morphological relation given in (12) creates sharp boundaries for morphology, clearly adjudicating questions regarding the morphological status of any lexical relation[iv]. The words *gleam* and *glow*, though sharing the sequence /gl/, differ in that one word ends in /ow/ and the other in /ijm/. English does not exploit this contrast anywhere else. The same can be said of *berry* and *cranberry*, *tomato* and *potato*, *cheese* and *cheddar* and, obviously, of Bender's *wander*$_V$ and *spider*$_N$. The formal and grammatical differences between these pairs of words are given below. As these differences are not found anywhere else (with the same meaning contrast) and cannot be used to create new words, morphology should have nothing to say about them.

(13) a. /X/$_N$ vs /krænX/$_N$

b. /tɔmX/$_N$ vs /potX/$_N$

c. /spɑjdX/$_N$ vs /wandX/$_V$

We do not wish to imply that words like *berry* and *cranberry* are not related at all; anyone can see that both the form and meaning of one word is included in the other. Lexica are obviously swarming with formal, semantic and grammatical relations that have nothing to do with morphology[v]: *horse* and *mare* are semantically and grammatically related, *hippopotamus* and *hypothalamus* certainly sound alike and, in Bender's defense, this resemblance may even be helpful in remembering one of the words, but it is our argument that these types of lexical relations play a less central role in grammar and should be kept distinct from productive[vi] (or core) morphology.

4. The creation of a morphological strategy

The productive differences we identified as morphological relations can be represented as bi-directional implications, or strategies. Given definition (12), the bi-directionality of these strategies should require no further justification: given two words w_{1-2}, if w_1 differs from w_2, w_2 must also differ from w_1. We will use the formalism of Whole Word Morphology given below (cf. Ford & Singh1991, Ford et al 1997 and Singh and Dasgupta 1999) to represent morphological strategies.

    (14) $/ X /a \leftrightarrow / X' /b$

    where:

    a. $/ X /a$ and $/ X' /b$ are words and X and X' are abbreviations of the forms of classes of words belonging to categories a and b (with which specific words belonging to the right category can be unified or onto which they can be mapped).

    b.   ' represents (all the) form-related differences between $/ X /$ and $/ X' /$

    c.   a and b are categories that may be represented as feature-bundles

    d.   the $\leftrightarrow$ represents a bi-directional implication (if X, then X' and if X', then X)

    e.   X' is a semantic function of X

To illustrate how a morphological strategy is created, let us begin with the following English verbs and nouns:

    (15)   *receive*$_V$ *reception*$_N$
                    conceive$_V$ *conception*$_N$
                    deceive$_V$ *deception*$_N$

Semantics aside, (16) represents both the similarities and differences found between each pair of words. (For the sake of brevity, only the relevant comparisons have been made).

(16)

		Differences	Similarities
receive$_V$ vs. reception$_N$		/...**i**j**v**/$_V$ ↔ /...ɛpʃən/$_N$	/**ri s**.../
conceive$_V$ vs. conception$_N$		/...**i**j**v**/$_V$ ↔ /...ɛpʃən/$_N$	/**kɑns**.../
deceive$_V$ vs. deception$_N$		/...**i**j**v**/$_V$ ↔ /...ɛpʃən/$_N$	/**di s**.../

As anyone can see, the condition for the creation of a morphological strategy is met in (16) since all three pairs of words share the exact same differences. We can represent the differences in (16) as constant material and the similarities as variables, as in (17). It is important to point out that the X as a variable is doubly grounded: syntagmatically, it ranges over formally similar strings or sub strings and paradigmatically it ranges over formally distinct strings. The number of words required is thus a direct consequence of this double grounding.

(17)   /X**i**j**v**/$_V$ ↔ /Xɛpʃən/$_N$

We can make further use of the formal properties of the words in (15) by specifying as constant all the similarities found, not between the words, but between the similarities found between the words, so as to avoid forming *beleption$_N$ from the word believe$_V$. In (16), all three sets of similarities end with an /s/ that is preceded by exactly one syllable. The restricted morphological strategy relating the words in (16) is as follows:

(18)   /Xs**i**j**v**/$_V$ ↔   /Xsɛpʃən/$_N$
          | |
          σ   σ

While we suggest that morphological strategies must be maximally restricted at all times, it is clear that, as the speaker learns new words, she may discover that some strategies are too restrictive and recalculate the restrictions based on a larger set of words.

5. Conclusion

In this paper, we have shown that the traditional assumption under which morphological relatedness is motivated by similarities of form and meaning is at best inadequate, if not untenable. Extending the Saussurean view that words are defined by the differences between them, we have argued that the morphology of a language resides exclusively in differences exploited in more than one pair of words. While extremely simple, this definition creates sharp boundaries for morphology and obviates the need to resort to the linguist's intuition in determining which lexical relations actually pertain to morphology. A proper focus on contrast or difference also makes it easy to create an algorithm for the acquisition of morphology and opens the door for a variety of computational implementations. With the help of a computer programme he designed, Neuvel (forthcoming) implements our proposed definition to demonstrate precisely how the systematic exploitation of contrast proceeds and, analogously to acquisition (of morphology), enriches a given lexicon.

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[i] Language is a system of interdependent terms in which the value of each term results solely from the simultaneous presence of the others, as in the diagram: (De Saussure, 1959: 114)

[ii] The conceptual side of value is made up solely of relations and differences with respect to the other terms of language, and the same can be said of its material side. The important thing in the word is not the sound alone but the phonic differences that make it possible to distinguish this word from all others, for differences carry signification. (De Saussure, 1959: 118)

[iii] Our insistence on exactly the same semantic difference leads an anonymous reviewer to object that under our analysis even *receive/reception, conceive/conception* cannot be morphologically

related since reception has the additional interpretation 'a social gathering'. There are two responses to a misunderstanding of this sort: (1) The opaque interpretation 'a social gathering' is an additional semantic drift that does not block the transparent interpretation made available by morphology and (2) 'semantics' here is to be understood as 'mediated by rules of interpretations' and NOT as fixed featural specifications of words. The rules of semantic interpretation crucially invoked in clause (e) of (14) are to be construed as providing interpretations for lexically grounded 'derivational drifts' which are situated within scenarios and metaphors, paralleled once again in at least two pairs of words which share the *sine qua non* of form required by (14b),

[iv] One reviewer points out that neologisms not fashioned after existing word pairs are sometimes attested. We are aware of this and wish to draw the reader's attention to the fact that they are indeed rare, consciously created, and quite possibly outside the domain of morphology as this phenomenon involves the boundary between synchronic description and creativity constituting change (cf. Neuvel (2000).

[v] An anonymous reviewer believes that "any satisfactory account of English morphology must classify *inception* as morphologically parallel to *reception*." This confusion between 'parallel' and 'related' is, unfortunately, almost endemic. It is precisely by ruling out such esoteric interests that morphology can appropriately delimit itself. For example, *consume/consumption, donate/donation* and *note/notation* are obviously parallel in many ways but nonetheless require different Word Formation Strategies, which, we repeat, treat morpho-phonology as an integral part of morphological relations. This is something that is ignored by our referee when s/he uses an expression like "give or take some morpho-phonology" to save the assumption that such words are produced by the same rule of word formation. Our reviewer's apparent attempt to generate words like **conceivetion, *notetion* and **consumetion* is misguided because it ignores the morphologicality of morpho-phonology and the locality of WFSs.

[vi] the term "productive" is used here in the sense of 'useful' and refers to morphological strategies that can be used to create SOME words, not to strategies that can apply to any word of a given category. An anonymous reviewer asks: why local strategies don't always generalize. For example, given *wife/wives, knife/knives*, a WFS would generate **fives* as the plural of *fife*. Given that our strategies will allow the 'output' *fifes* via the general WFS $/X/_{N. Sing.} \leftrightarrow /Xz/_{N. Plur.}$ and the output **fives* via the WFS $/Xf/_{N. Sing.} \leftrightarrow /Xvz/_{N. Plur}$, the question is incomprehensible because the speaker either knows that the relevant plural is *fifes* or COULD, as we predict, in fact generate one of the two forms. Our reviewer unfortunately seems not to have understood that morphology is projected from individual lexica and NOT from some mega dictionary.

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