Canonical derivational morphology[1]

Greville G. Corbett

Abstract

The approach of Canonical Typology has proved fruitful for investigating a range of problems in syntax, inflectional morphology and most recently in phonology. It is therefore logical to take a canonical approach to derivational morphology. It provides a new perspective on some old issues, showing how previous key ideas fit together. The criteria proposed prove to have some degree of external justification. And from the point of view of canonical typology the results are particularly promising, since the criteria are interestingly different from those proposed in other domains.

1 Introduction

In this paper I take a novel perspective on derivational morphology, that of canonical typology. This will mean revisiting some basic issues within derivational morphology (which is something we should do at intervals). Conversely, from the viewpoint of canonical typology, derivational morphology proves particularly difficult and – eventually – quite exciting.

2 Canonical typology

Adopting a canonical approach means that we look for definitions which allow us to distinguish between interesting sets of data, and we take such definitions to their logical end point. This enables us to build theoretical spaces of possibilities. Only when we have established our clear definitions, and the space they define, do we investigate how this space is populated with real instances. Canonical instances are those that match the canon: they are the best, the clearest, the indisputable ones. Given that they have to match up to a logically determined standard, such instances are unlikely to be frequent. They are more likely to be rare, and may even be non-existent. This is not a difficulty. The convergence of criteria fixes a canonical point from which the phenomena actually found can be calibrated. This approach has been worked out particularly for inflectional morphology, as well as for syntax, and more recently for phonology.

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It is worth distinguishing clearly between canonical and prototypical, though rereading a few pages of Rosch should be sufficient to convince the reader of the differences. A prototype, at least in the term's prototypical use, has an exemplar, is in speakers' heads (it is claimed to be psychologically real), and can vary across cultures. Canonical instances need have no exemplar, they are not claimed to be part of speakers' competence (they are theoretical constructs of linguists), and they are ideally invariant. An analogy to the canonical is the system of cardinal vowels. Starting from vowels of different degrees of openness and frontness, phoneticians following Daniel Jones invoke a potential vowel that is maximally close and maximally front. This serves as an anchoring point for the vowel space, irrespective of whether we find such an extreme vowel in a given language. In canonical typology, inflectional morphology has been treated by Baerman, Brown & Corbett (2005: 27–35), Spencer (2005), Stump (2005b, 2006), Corbett (2007a, 2007b, 2009), Nikolaeva & Spencer (2008), Stump & Finkel (2008) and Thornton (2008), and phonology by Hyman (2009). In syntax, agreement has occupied centre stage, for instance in Corbett (2003, 2006), Comrie (2003), Evans (2003), Polinsky (2003), Seifart (2005: 156–74) and Suthar (2006: 178–98).

A working bibliography of this growing body of research can be found at http://www.surrey.ac.uk/LIS/SMG/CanonicalTypology/index.htm.

3 Canonical derivational morphology

I will try to characterize synchronic canonical derivational morphology. That is, that part of morphology that deserves our particular attention as derivational, within a currently functioning language system. The diachronic interest of derivation will have a secondary role. Hence our two principles:

Principle I: Canonical derived words have clear indicators of their synchronic status.
Principle II: Canonical derived words are fully distinct from their base.

Principle I is made explicit in three criteria.

3.1 Many-to-many substitutability

Criterion 1: Canonical derived words consist of a base and at least one derivational marker, each of which can be substituted to yield another derived word.

The key idea is that a canonical derived word gives clear indicators of its status as synchronically derived. So if we take *paint-er*, we can substitute the base with another base, and indeed many other verbs fit there. We can also substitute the affix and so establish that *paint* is a base

(1) Many-to-many substitutability: a simple example

painter	←	paint	
runner		painting	drawing
singer		repaint	redraw

If we start from English *painter*, we see that the base is *paint*. Given that base, we can substitute various derivational markers in place of *-er*, for instance, we can derive *painting* and *repaint*. From the other perspective, if we hold the derivational marker *-er* constant, we can substitute other bases, as in *runner* and *singer*. Thus we have many-to-many substitutability of base and derivational marker.

Let us now turn to a more substantial example. We consider Russian, and in particular its colour terms. The system is specially interesting, since Russian is claimed, unusually, to have twelve basic colour terms. As part of an investigation of the system, Corbett & Morgan (1988: 38) plotted the word-formation potential of these basic colour terms. They based themselves on the dictionary of Worth, Kozak & Johnson (1970); some of the results are given in (2). In the left column we see the basic colour terms. Along the top are arranged various means of word-formation (and these are combined when they have the same distribution with respect to colour terms). Where a particular term (listed on the left) combines, according to the source, with the word-formational device (listed along the top), this is indicated with a tick. Thus *belyj* 'white' combines with *-ovatyj* '-ish' to give *belovatyj* 'whitish'. The column 'Total 1' indicates the number of forms (derivational and compounded) arising from the combination with the items indicated along the top of the table (and since some columns include more than one formative, the total can exceed the number of the columns). The more significant column 'Total 2', gives the number of items formed from the basic colour terms using all the devices listed in the dictionary.

(2) Word-formation potential of Russian basic colour terms

Word-formation possibilities of Russian Basic Colour Terms (based on Corbett & Morgan1988: 38)

	ovat-yj (1)	Ø / po (et') (2)	za–et' (3)	těmno–yj (4)	svetlo–yj (5)	–en'kij (6)	jarko–yj (7)	–et'sja (8)	–' (9)	sero–yj (10)	–jak (11)	–ec (12)	–uska (13)	– (it' / enie) (14)	za–et'sja (15)	blěklo–yj (16)	bledno–yj (17)	–izna (18)	serebristo–yj (19)	do–na (20)	pere–it' (21)	iz–it' (22)	vpro–' (23)	po– (it' / ěnnyj) (24)	Total 1	Total 2
belyj 'white'	✓	✓	✓			✓		✓			✓	✓		✓	✓			✓	✓	✓	✓			✓	23	135
černyj 'black'	✓	✓	✓					✓	✓		✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	25	67
krasnyj 'red'	✓	✓	✓	✓	✓	✓	✓	✓												✓					10	39
zelënyj 'green'	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓					✓	✓	✓	28	63
žëltyj 'yellow'	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓			✓	✓	✓	✓	28	56
sinij 'dark blue'	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓		27	71
goluboj 'light blue'	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓			✓	✓	✓							15	43
koričnevyj 'brown'	✓				✓																				2	3
seryj 'grey'	✓	✓	✓	✓	✓	✓		✓	✓		✓							✓	✓						12	20
rozovyj 'pink'	✓	✓	✓		✓												✓								6	13
fioletovyj 'violet'				✓			✓																		2	6
oranževyj 'orange'					✓																				1	3

We see that there is a substantial number of bases, which can be shown to be available for the addition of various affixes. And similarly there is a substantial number of affixes, which are available for different bases. However, as is often the case in derivational systems, the coverage is patchy; numerous combinations are not attested. (For the study of colour terms, it is noteworthy that if a new term takes on basic status it can rapidly reach the expected frequency level, but acquiring derivatives takes much longer, as documented in Corbett & Morgan 1988.)

Of course, derivation can also be realized through other morphological means, including intercalation, reduplication and stress alternations. Such derivations would be less canonical in terms of the morphological means, but could be more or less canonical according to the other criteria to be discussed.

3.2 Regular (transparent) semantics

Criterion 2: The meaning of a canonical derived word can be computed regularly from the meaning of the base and the additional meaning of the derivation.

This criterion is relatively straightforward. Consider these Russian data:

(3) Deverbal agent nouns in Russian

pisat'	'write'	pisatel'	'writer'
čitat'	'read'	čitatel'	'reader'
osnovat'	'found'	osnovatel'	'founder'
. . .[2]			
BUT: dvigat'	'move'	dvigatel'	'motor'

The simple point here is that most of the derived nouns are canonical in terms of Criterion 2; their meaning is regularly derived from the parts. However, *dvigatel'* 'motor' is less canonical: its primary meaning is not what would be predicted from the base and the derivational affix.[3] See Hippisley (forthcoming) for a Network Morphology analysis of the data, and Lieber (2005: 403–6) for sources and discussion of comparable forms in English.

The canonical ideal would be full compositionality in meaning. Dressler (2005: 271) argues that Frege's principle of semantic compositionality can hold only for syntax and it cannot hold fully for word formation. He suggests that accepted words are lexicalized, while 'not yet accepted neologisms, generally, realise only one of the potential meanings of a compound or derivation.' (2005: 271). We should still take full semantic regularity as canonical, since that is the logical end point, even if Dressler should prove right and full semantic regularity should turn out to be not fully attainable in derivation. The point will need further discussion (§3.7), since semantic regularity is taken as a possible criterion for distinguishing inflectional morphology from derivational (see, for instance, Stump 2005a: 55).[4]

Note that this approach does not mean that we need to treat affixes as morphemes. We may agree with Carstairs-McCarthy (2005: 22): 'It will be understandable if many readers conclude that the term "morpheme" has hindered rather than helped our understanding of how morphology works.' Criterion 2 applies equally well if one assumes a realizational account.

3.3 Transparent form

Criterion 3: The form of a canonical derived word is transparent: its structure, consisting of base and derivational marker(s), is evident.

At one level this is simple. If we look again at the derived forms in (3), the regular pattern exhibited by these and by a considerable number of further items is sufficient to suggest that the form is transparent.

Beyond that there are more difficult issues. There are instances where a derived word is recognizably different from a simplex word; Kaisse (2005) gives a fine overview of such cases in English, associated with the system of stress. I suggest that this type of differentiation is not the canonical type. As always in canonical investigations, we need to be aware of the 'Venus effect'. If asked about planets, Venus is the easiest example, because it is most often visible – we can point to it. But it does not follow that it therefore has any other special status. I suggest that the transparency of form of a canonical derived item is by comparison with its base: a canonical derived word is recognizably different from its base.

We should also ask whether there is evidence within the morphological system for transparency of form; in other words whether morphological rules have access to the internal structure of words. In his review of Anderson's *A-Morphous Morphology*, Carstairs-McCarthy provides insightful discussion of this issue, stating that the evidence is 'frustratingly equivocal' (1993: 213). For discussion of how affix ordering is determined see Hyman (2003); and for the issue of selection between base and affixes see Lieber (2006), and especially Plag & Baayen (2009).

3.4 Outcome: synchronic derivability

The combination of Criteria 1, 2 and 3 means that the speaker could if required re-create a canonical derived word. Equally the listener could decompose a canonical derived word in order to parse it (see §6.1 for discussion of possible evidence supporting this view). In other words, canonical derivation is recognizable; even if the form is in fact stored, we could create or parse it 'again' on the fly. In this respect, derivation is similar to inflection (see §4 below). Of course, synchronic derivability is a key part of productivity; the concern with what is possible as opposed to what is actually found in derivational morphology goes back at least to Aronoff (1976); for a survey of this area see Bauer (2005), and for an overview of constraints on productivity see Rainer (2005).

We now turn to the second principle:

Principle II: Canonical derived words are fully distinct from their base.

There are two relevant criteria here:

3.5 Separate lexical index

Criterion 4: A derived word has a separate lexical index.

This is the reflection of the distinct nature of a derived word, as expressed in Principle II. A derived word is a different lexeme, and has its place in the lexicon. An implementation of this state of affairs can be seen, for instance, in the Network Morphology account in Hippisley (forthcoming).

3.6 Additional semantic predicate

Criterion 5: A derived word includes an additional semantic predicate in comparison with its base.

This criterion is due to Andrew Spencer; see, for instance, the proposed characterization of a canonical affix in Spencer & Luís (forthcoming): 'Affix: canonically a suffix which realizes the value of a morphosyntactic property (inflection) or added semantic predicate (derivation).' Thus the divide between canonical inflection and canonical derivation is located in the addition, or not, of a semantic predicate (see §4.1).

3.7 Nameworthiness

Derivational morphology serves to create terms for nameworthy concepts (cf. Mithun & Corbett 1999, where the discussion is concerned with incorporation, but the point is equally valid here). Derived words are created where there is a need. This is what gives rise to the 'patchy' nature of derivational morphology, its appearance of being a set of incomplete projects (see Anderson 1985a); this is the picture we see clearly in (2) above. This observation runs counter to the criteria given in §3, and is not itself a criterion for canonical derivation. Rather it shows clearly the difference between what is prototypical and what is canonical. If we wished to characterize prototypical derivation in a particular language we might well include the requirement that derived forms would denote nameworthy concepts and would constitute a partial system with numerous gaps. Our first concern, however, is to characterize canonical derivation. The fact that in this respect reality frequently departs from the canonical is interesting, though not surprising (and the second conclusion of Plag & Baayen 2009: 146–7, on the role of memory, is relevant here). We return to the discrepancy between the canonical and the frequently observed in §4.2.

4 Relation to previous key ideas

In this section we consider first how this approach relates to its roots in morphological research and then in terms of recent work on canonicity.

4.1 For morphology

In the discussion above (§3.4) we noted that canonical derivation shares characteristics with canonical inflection. The literature includes many examples of investigations aiming to distinguish derivation from inflection, for instance: Matthews (1974: 43–58), Anderson (1985b: 162–5), Bybee (1985: 81–110), Corbett (1987: 327–9), Scalise (1988), Dressler (1989), Plank (1994), Wurzel (1996), Stump (1998), Booij (2000), Percov (2001: 69–112), Haspelmath (2002: 70–83), Bauer (2004), Carstairs-McCarthy (2005: 18–20), Spencer (2005: 111–4) and Stump (2005a: 53–8). For a discussion of the difference in terms of productivity see Carstairs-McCarthy (2002: 85–99). Several researchers comment on the difficulty of drawing the distinction, and for good reason, as we shall see: canonical derivation does indeed look rather like canonical inflection.

Let us start from the idea that the key difference in derivational morphology is that there is an additional semantic predicate. This makes the derived items sufficiently different from the base for it to require its own lexical index (§3.5). It is here that the common diagnostic of change of part of speech (word-class) fits in. Change of word-class frequently goes hand in hand with the addition of a semantic predicate. However, this is another instance of the 'Venus effect'. Change of part of speech is not a necessary condition for derivation. Furthermore, according to Haspelmath (1996), it is not a sufficient condition either. Spencer (1999) talks of 'transposition', discussing examples where there is a change of part of speech but, he suggests, no more than that.[5] Hence change of part of speech is a common but not necessary concomitant of adding a semantic predicate.

Let us now view the problem from the side of inflection. Here, of all the criteria for inflectional morphology, obligatoriness is of special importance. This well-known criterion was highlighted by Jakobson, in his discussion of Boas (1938: 132–3). Jakobson produced the famous quote: 'Thus the true difference between languages is not in what may or may not be expressed but in what must or must not be conveyed by the speakers.' (1959/1971: 492)[6] The obligatoriness criterion for inflectional morphology is important for us because it addresses the issue of the extra predicate. If a form is obligatory this will not introduce an extra predicate. Thus, for instance, the selection of a form according to the dictates of syntax is obligatory (and inflectional), rather than derivational. Thus contextual inflection is canonical as inflection, and furthest from derivational morphology. However, inherent inflection too can be obligatory (thus an English noun must be in one or other number) and hence not derivational.

4.2 For canonical typology

For canonical typology the investigation of derivational morphology is of considerable interest, because it shows a new way in which canonical criteria can operate. The point is

that 'canonical derived word' is not to be described as other canonical notions, but rather with a set of 'relative to' statements. A canonical derived item is calibrated in relation to a base. It can be seen that this is the effect of Principles I and II. Canonically a derived word should be phonologically 'larger' than its base (not just large); it may have different stress perhaps (but not just the pattern of a derived item). This is a new sort of typology, but of course it answers directly to the underlying intuition in terms such as 'derived form'.

While canonical derived forms are unusual, our typology situates several phenomena that are not canonical. There can be an additional semantic predicate without a change in form (as in some instances of conversion). Or we can find items with a change in form but no additional semantic predicate, as with so-called 'empty morphs' and 'superfluous morphs', for which see Anderson (1992: 53–4; 2006: 199). As instances of empty morphs in derivation, Anderson (2006: 199) gives English *crime/crimi**n**al, page/pagi**n**ate, sense/sens**u**ous, habit/habit**u**al/habit**u**ate,* where the elements in bold bring no additional semantics. Another type of non-canonical derivation is a phenomenon pointed out by Stump, who writes (2005a: 64) 'Quite frequently in language, the sole morphological expression of a lexeme's derivation is the way in which it inflects.' A convincing example he gives is that of Sanskrit causativization, which involved shifting a verb into the tenth conjugation.

5 What evidence do we find for the canonical criteria proposed?

There are two types of evidence, suggesting that the criteria we have used have some validity.

5.1 Psycholinguistic evidence

It is important that we interpret psycholinguistic evidence with the caution which psycholinguists typically show.[7] There are some types of evidence here which give cause for encouragement. First there is strong evidence for the importance of semantic transparency, as shown in the classic article by Marslen-Wilson, Tyler, Waksler & Older (1994), using cross-modal priming; this is directly relevant to Criterion 2.

A second type of work is that exemplified by Janssen & Caramazza (2003). In a production experiment, speakers of Dutch named pictures using phrases consisting of determiner and noun. By analysis of reaction times, Janssen & Caramazza concluded that when diminutives were used, the base noun's gender had an impact on the selection of the determiner even though the derived noun was of different gender. This can be seen as evidence that the base is still accessible to the speaker in derived forms (which is relevant to Criterion 3). There is interesting evidence for the decomposition of derivationally complex words, and of items which appear so in their form, though they are no longer transparently derived (e.g. English *hardly*) presented in Marslen-Wilson & Tyler (2007: 831–2) and in Marslen-Wilson (2007); this too is directly relevant to Criterion 3.

And then the work on morphological family size is particularly germane here (de Jong, Schreuder & Baayen 2000). 'The morphological family size of a word is the type count of all the complex words in which this word appears as a constituent ...' (Moscoso del Prado Martín, Deutsch, Frost, Schreuder, De Jong & Baayen (2005: 496), and references there. Note that this includes compounds together with instances of derivational morphology. In a series of papers, Harald Baayen and his associates have shown that, all other things being equal, words with larger family sizes are responded to more quickly in visual lexical decision than are words with smaller families. I had taken this as evidence for the effect of transparency of form of derived words. However, in a recent paper, Milin, Kuperman, Kostić & Baayen (2009: 247–8) state that the family size effect has always been understood as semantic in nature, but that their recent work suggests rather that it is 'a composite effect that bundles together effects of semantic similarity and effects of paradigmatic structure.' One of the results of Schreuder & Baayen (1997) is very relevant here. They compared monomorphemic Dutch nouns in visual lexical decision experiment. Those nouns with a larger morphological family size were responded to more quickly. (Recall that family size refers to the number of derivatives (types), where derivatives include both derivations and compounds.) Thus speakers have access to the fact that certain lexical entries also function as a base for derivation, which is surprising given that monomorphemic nouns were investigated. This interesting result bears on §3.4.

5.2 Diachronic evidence

The evidence here concerns the possessive adjectives of Slavonic. These are of interesting status, but are arguably derived forms. The particular derivational affix required to form the possessive adjective, in some Slavonic languages, is predictable from the inflectional class of the noun; in others the gender is the best predictor. Consider these patterns (data and sources in Corbett 1987: 325–6):

(7) Motivation for the possessive adjective in Slavonic

Inflectional class of base	I	II	II
Gender of base	M	M	F
Russian (original system)	Ivan 'Ivan' > Ivan**ov**	papa 'daddy' > pap**in**	mama 'mummy' > mam**in**
Upper Sorbian (innovative system)	Jan 'Jan' > Jan**owy**	starosta 'headman' > starost**owy**	sotra 'sister' > sotř**in**y

We see that in languages like Russian, the form of the possessive adjective is predictable from the noun's inflectional class and not from its gender. This is clear from the column, which has nouns like *papa* 'daddy', which belong to inflection class II. This class contains mainly feminine nouns; thus for the examples in this column the inflectional class and

the gender do not overlap as they normally do, and we can see which is the predictor. Several Slavonic languages (Upper Sorbian: Belorussian, Slovenian, Czech, Slovak, and Lower Sorbian) have moved away from this original situation and now form the possessive adjective according to gender (clear again from the *papa/starosta* column). The point for present purposes[8] is that at the time of change, speakers must have been aware of the affix as being derivational, and 'rederived' a new form according to gender rather than inflectional class.

6 Conclusion

By investigating the notion of canonical derivational morphology we have gained a new perspective on an old problem. From the point of view of canonical typology, the results are exciting, since the picture that emerges is rather different from all previous investigations of this type, in that canonicity is here defined always as relative to other phenomena. Instances of canonical derivational morphology are rare, of course, as is normally the case for canonical typology. In this particular instance, however, what is typical and what is canonical are very different. And this is a valid view of derivational morphology, where for particular languages we can often specify the systematicity but also point to a patchy coverage of the space of possibilities. This tension arises because derived words are typically not just the sum of their parts, but are also 'word-worthy' (derived to meet a lexical need), a property which tends to weaken the connection of the derived word to its components.

Notes

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2. For lists of the many further examples see Lazova (1974) or Zaliznjak (1977).
3. The agentive examples in Russian do indeed appear to be those whose meaning is regularly derived from the parts, while the instrument examples are more idiosyncratic.
4. See also the discussion of regularity in Mutz (2008).
5. Another more contentious instance concerns the bafflingly complex behaviour of Russian numerals. According to one account (Corbett 1978), their different syntactic and morphological patterns can be described in terms of changes of part of speech: there is no question here, however, of any additional predicate or of a derivational relation.
6. Mel'čuk (1960/1974) discusses this criterion and points out (1974: 111) that he wrote his 1960 article in 1958, before he saw Jakobson's 1959 article. Percov (1996: 40, 2001: 71) traces the history of the notion back through Jakobson to Boas and before him to Maspero (1934: 35). However, I believe Jakobson is right to give primacy to Boas, since the idea can be also

found in Boas, in his Introduction to the *Handbook of American Indian languages* (1911: 35–43, especially 40–3).

7. See Bauer (2001: 100–24) for a review of psycholinguistic work relating to productivity.
8. These data were cited in Corbett (2009), but to illustrate a slightly different point, namely that inflectional class membership may be predictive of other things.

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Author's address: (Greville G. Corbett)
Surrey Morphology Group
Department of English (FI)
Faculty of Arts and Human Sciences
University of Surrey
Guildford
Surrey, GU2 7XH
Email: g.corbett@surrey.ac.uk