

WHAT MORPHOLOGY CAN TELL US ABOUT GRAMMAR

Andrew Carstairs-McCarthy

University of Canterbury, Christchurch, NZ

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Abstract

Most evolved characteristics of organisms show aspects of poor design due to historical accident. It would be surprising if language were different. I argue that the existence of morphology, distinct from syntax, is one example of poor design. Yet there are things that morphology is good at which help to account for otherwise mysterious and apparently functionless morphological phenomena. I give four examples, involving data from Afrikaans, Russian, Polish and Italian. Syntacticians need to bear in mind that aspects of syntax may be poorly designed also. I suggest that grammatical functions such as 'subject' and 'object' may fall into this category.

I am not a practitioner of Lexical-Functional Grammar, so it may seem surprising that I should contribute to the proceedings of a LFG conference. However, I was available locally at the Christchurch venue of the 2004 conference, so having me as one of the invited speakers may have been attractive as a way of keeping down costs! More seriously, I have things to say about the design of language that do impinge on LFG's central concern with grammatical functions.

Is language well designed? More specifically, is grammar well designed? A wide range of contrasting answers have been offered recently to this question, either explicitly or implicitly (e.g. Pinker & Bloom 1990; Uriagereka 1998; Jenkins 1999; Carstairs-McCarthy 1999; Bickerton & Calvin 2000, especially Bickerton's 'linguistic appendix'; Chomsky 2001; Hauser, Chomsky & Fitch 2002; Givón 2002; Jackendoff 2002; Christiansen & Kirby 2003). Assessing these answers depends in large part on how we answer a prior question: What does it mean for any characteristic of any organism or species to be well designed?

This question has given rise to considerable debate and controversy in evolutionary biology. At risk of seeming presumptuous, I will offer a succinct answer. Rather than ask about good design, we should ask about design that it is good enough for the species to survive. Each characteristic of every species living at any moment in history must be designed well enough for the species to have avoided becoming extinct through predation and competition for resources. But design that is good enough for survival is not necessarily the best design imaginable. Douglas Adams in *The Hitchhiker's Guide to the Galaxy* invites us to imagine that our world was in part the outcome of a design competition, in which Slarty Bartfast won a prize for contributing Norway. However, nature is replete with designs that would win no such prizes. Here are examples of organs that are designed poorly for the functions that they fulfil but are still good enough to enable many species endowed with them to survive:

- the vertebrate eye
- the mammalian sperm ducts
- the alimentary and respiratory canals of land vertebrates

In the eyes of vertebrates (by contrast with cephalopods, such as octopuses) the nerves are attached to the light-sensitive cells of the retina not at the back of the

eyeball but inside it, between those cells and the lens, thus reducing the amount of light that can reach the retina. The mammalian sperm ducts, which lead from the testes to the penis, are much longer than they need to be, because they loop over the ureters which connect the kidneys with the bladder. Finally, because the nose is above the mouth rather than below it, the respiratory and alimentary canals are forced to cross, thus creating a risk of choking. As the evolutionary biologist George C. Williams puts it (1992: 7): ‘Many features of living organisms are functionally arbitrary or even maladaptive.’ For these design faults to be remedied, a reduction in fitness (perhaps drastic) during the short and medium term would be necessary; and there is no way in which natural selection can ‘plan ahead’ so as bring this about. These less-than-perfect characteristics arise because natural selection has no say over the genetic raw materials available for it to work on; it has to make do with what is supplied by historical accident. If circumstances change so that a once adequate design is no longer good enough, the species in question simply becomes extinct.

We do not know for certain what the genetic raw materials were on which natural selection operated so as to yield language. But, whatever they were, it would be surprising if they did not leave residues in the form of less-than-perfect design features. Identifying such features is curiously difficult for us linguists, however, because there is no linguist who is not a native speaker of some human language. We are presented in nature with a variety of different ways in which eyes can be structured. On the other hand, we are not presented in the real world with radical alternatives (Martian or Venusian, perhaps) to the kind of organization and structure that our own grammars exhibit. One way of overcoming this lack is to consider what grammar would need to look like if we, as designers of it, were to stand a chance of winning a prize in Douglas Adams’s competition. What are some of the design desiderata for a potentially prize-winning Universal Grammar? I can think of at least three:

- (i) a consistent way of coding thematic roles (Agent, Theme, Goal, etc.)
- (ii) a consistent way of packaging information (given versus new, topic versus comment, focus, etc.)
- (iii) a single pattern of grammatical organization (not two or more)

Are these desiderata satisfied? Short answers are as follows:

- (i') No, there is no consistent way of coding thematic roles, although grammatical functions (subject, object, etc.) contribute.
- (ii') No, there is no consistent way of packaging information, although linear order plays a large part, and grammatical functions (subject, object, etc.) contribute.
- (iii') No, because morphology and syntax are distinct patterns of organization.

The appearance in both (i') and (ii') of grammatical functions, as a sort of make-do device with at least two distinct applications, should intrigue proponents of any syntactic theory in which grammatical functions play a central role, such as Lexical-Functional Grammar. However, as befits a morphologist, I will concentrate in this paper on (iii').

Does morphology have a clearcut function, so as to be plausibly an adaptation created through natural selection? Alternatively, is it what Williams would call a functionally arbitrary or maladaptive characteristic of language, an accidental

byproduct of prehistoric circumstance? It is difficult to say ‘yes’ to the former question. Morphology does two things: it is used in the formation of some lexical items (through derivation and compounding), and in the encoding of some grammatical properties. But it is not essential for either purpose. In most if not all languages, many complex lexical items have an internal structure that is syntactic rather than morphological. These are called clichés if their meaning is compositional and idioms if their meaning is not compositional. Also, in some languages such as Vietnamese, as is well known, there is no or almost no morphological coding of grammatical information. If morphology did not exist, it would not be missed. There is no respect in which language would be less expressive without it. In a morphology-less world, no linguists would puzzle over why there existed only one pattern of grammatical organization (namely syntax), not two. So why does it exist? Presumably for reasons independent of what it is currently used for. I have suggested such reasons elsewhere (Carstairs-McCarthy 2005): morphophonological alternation, and the paradigmatic relations between alternants, are what got morphology started. But, putting the question of origin aside for the moment, we can profitably ask a question about its contemporary characteristics: given that (as I have said) morphology is not needed to serve either grammatical or lexical functions, is there anything that it is particularly good at, whether functional or not? The answer that I will suggest is that it is good at synonymy avoidance, and hence consistent with ‘fast mapping’ or quick learning. However, among the ways in which synonymy is avoided are some that have nothing at all to do with syntax or semantics in the normal sense. I will presently mention four diverse morphological phenomena that illustrate this. First, though, I will say a little more about synonymy avoidance in general.

Eve Clark, discussing the acquisition of vocabulary in childhood, puts forward a Principle of Contrast (Clark 1992:64): ‘Speakers take every difference in form to mark a difference in meaning.’ This principle, or something like it, shows up in the strong tendency of young children to assume that any new word that they encounter means something new, and is not a mere synonym of some word that they know already. What is remarkable is that this expectation of semantic novelty is apparently shared with chimpanzees (David Premack in Piattelli-Palmarini 1980:229; Savage-Rumbaugh 1986) and even with German shepherd dogs (Kaminski et al. 2004; Bloom 2004). As Premack puts it, talking about experiments on chimpanzee cognition using plastic tokens as ‘words’: ‘Even the stupidest animal rapidly constructs the sentence, ‘Give X [the animal’s name] this new piece of plastic’. In other words, the animal requests the unnamed item with the so far unused piece of plastic. Thus the chimpanzees recognize that the potential word, which has not yet been so employed, is the appropriate thing to use in requesting the desired item, which is however not yet named.’ So a synonymy-avoiding propensity is not peculiar to humans.

My first example of a synonymy avoidance strategy in morphology involves *-e* (schwa) versus zero on attributive adjectives in Dutch and Afrikaans. In Dutch, an adjective carries *-e* if it is (i) plural (*grote huizen* ‘big houses’) or (ii) common gender (*een grote stad* ‘a big town’) or (iii) in a definite context (*het grote huis* ‘the big house’). That is, zero appears only with a noun which is singular, neuter and indefinite, e.g. *een groot huis* ‘a big house’). In Afrikaans, gender is lost, so one is naturally inclined to expect that this schwa, if it remains, should become more straightforwardly a marker of either definiteness alone or plurality alone, or perhaps of the distinction between attributive and predicative functions. But instead its distribution changes its character completely (Lass 1990; Bouman & Pienaar 1944; Donaldson 1993). An adjective in Afrikaans carries *-e* if it is:

- (i) syntagmatically complex: *ge-heim-e* ‘secret’, *be-lang-rik-e* ‘important’, *open-bar-e* ‘public’;
- (ii) paradigmatically complex, i.e. with more than one alternant: *vas* ~ *vast-e* ‘fast’, *sag* ~ *sagt-e* ‘soft’, *droog* ~ *dro-ë* ‘dry’, *dood* ~ *dooi-e* ‘dead’, *hard* [hart] ~ *hard-e* ‘hard’, *doof* ~ *dow-e* ‘deaf’, *nuut* ~ *nuw-e* ‘new’;
- (iii) semantically ‘complex’, i.e. used metaphorically or affectively: *'n enkel man* ‘a solitary man’ versus *'n enkel-e man* ‘a single (unmarried) man’; *'n bitter smaak* ‘a bitter taste’ versus *'n bitter-e teleurstelling* ‘a bitter disappointment’; *jou arm-e ding!* ‘you poor thing!’.

What has happened is that the schwa has entirely lost its role as an exponent of morphosyntax. Instead, it encodes information about the adjective on which it appears. This information has no function, either in communication or in the mental representation of experience; nevertheless, it suffices to ensure that a bare adjective form and any corresponding schwa-suffixed form are not entirely interchangeable.

My second example involves *-e* and *-u* as prepositional (or locative) case endings in Russian and Polish. Originally the *-u* belonged to the stem as a thematic vowel, but in both languages the original ‘o-stems’ and ‘u-stems’ have merged, leaving *-e* and *-u* as potentially synonymous affixes, in violation of the Principle of Contrast. Both languages solve the problem, but in completely different ways. The solution in Russian is, with certain nouns only, to use *-u* in specifically locational contexts, such as with the preposition *v* ‘in’ reserving *-e* for other prepositional-case contexts, such as with the preposition *o* ‘concerning’. These nouns include *sad* ‘garden’ and *les* ‘forest’, but not *dom* ‘house’. We thus find an inflectional contrast between *v sad-ú* ‘in the garden’ and *o sád-e* ‘concerning the garden’, and likewise between *v les-ú* and *o lés-e*, but no such contrast between *v dóme* ‘in the house’ and *o dóme* ‘concerning the house’. Thus, for a minority of nouns, contrast is maintained by the invention of a new case. In Polish, on the other hand, the distribution of the two suffixes follows the principle that *-e* is used if the noun has a special so-called ‘palatal’ stem alternant in the locative case, and *-u* if it hasn’t (Cameron-Faulkner and Carstairs-McCarthy 2000; Baudouin de Courtenay 1972 [1927]). Examples are:

- sy*[n] ‘son’: only one stem alternant [sin]: locative *sy*[n]-*u*
- Nixo*[n] ‘Nixon’: normal stem alternant [nikson], special alternant [niksoŋ]:
locative *Nixo*[n]-*e*
- Carte*[r] ‘Carter’: normal stem alternant [karter], special alternant [kartz]:
locative *Carte*[z]-*e* (Rubach 1984: 84)
- ko*[ŋ] ‘horse’: only one stem alternant [koŋ]: locative *ko*[ŋ]-*u*
- li*[st] ‘letter’: normal stem alternant [list], special alternant [liɕc]: locative
li[ɕc]-*e*
- li*[ɕc] ‘leaf’: only one stem alternant [liɕc]: locative *li*[ɕc]-*u*

In earlier Polish the vowel [e] generally triggered palatalization, but this is no longer the case, as is shown by (for example) the lack of palatalization in instrumental singular forms such as *sy*[n]em, *Nixo*[n]em, *Carte*[r]em and *li*[st]em. Instead, there is now a default expectation that a special stem alternant should exist for nouns with certain phonological shapes, including ones ending in non-palatalized coronal

consonants. That is why the two-stem pattern (and consequently the locative suffix *-e*) is found in foreign names such as *Nixon* and *Carter*. Only in a few common nouns such as *sy[n]* is this expectation overridden; they must be learned as having only one alternant. The suffix *-u* can thus now be glossed as simply ‘Locative’, while *-e* is distinguished from it (thus satisfying the Principle of Contrast) in that its information content is ‘Locative, with special stem alternant’.

The pair *li[st]* and *li[ɕc]* is interesting. They have the same etymological source, but split into two lexemes with distinct meanings and stem behaviour. This difference in stem behaviour has been accompanied by a divergence in their choice of locative suffix too, just as our generalization predicts. The fact that *-u* rather than *-e* shows up not only on nouns which have a palatal stem nowhere (e.g. *sy[n]*) but also on ones with a palatal stem everywhere (e.g. *ko[n]*, *li[ɕc]*) looks strange from a phonological point of view, but it falls into place neatly when one appreciates the contemporary rationale for the distribution of the two rival affixes. As Baudouin de Courtenay puts it (1972 [1927]: 282): ‘... in Polish the connection between the various endings of the declension and the final consonants of the stem was once different from what it is now ... In the past the chief distinction was between palatal and nonpalatal consonants: at present it is between consonants which change psychophonetically [i.e. alternate] in the declension vs. consonants which remain unchanged.’

My third example involves stem alternant distribution in Italian verbs, as discussed by Maiden (1992). In (1) are given the active present indicative and subjunctive forms of three Latin verbs *legere* ‘read’, *fugere* ‘flee’ and *trahere* ‘pull’. The shaded forms are ones where a velar consonant is a candidate for palatalization because it precedes the high front vowel *i*.

(1)

	Indic	Subjunc	Indic	Subjunc	Indic	Subjunc
Sg 1	lego	legam	fugio	fugiam	traho	traham
2	legis	legas	fugis	fugias	trahis	trahas
3	legit	legat	fugit	fugiat	trahit	trahat
Pl 1	legimus	legamus	fugimus	fugiamus	trahimus	trahamus
2	legitis	legatis	fugitis	fugiatis	trahitis	trahatis
3	legunt	legant	fugiunt	fugiant	trahunt	trahant

However, though palatalization occurs in the Italian reflexes of these verbs, its distribution does not follow the pattern in (1). Instead, we find a pattern of stem alternation for *leggere* ‘read’, *fuggire* ‘flee’ and *trarre* ‘draw, derive’ as in (2):

(2)

	Indic	Subjunc	Indic	Subjunc	Indic	Subjunc
Sg 1	lé[gg]o	lé[gg]a	fú[gg]o	fú[gg]a	trá[gg]o	trá[gg]a
2	lé[ddʒ]i	lé[gg]a	fú[ddʒ]i	fú[gg]a	trái	trá[gg]a
3	lé[ddʒ]e	lé[gg]a	fú[ddʒ]e	fú[gg]a	tráe	trá[gg]a
Pl 1	le[ddʒ]ámo	le[ddʒ]ámo	fu[ddʒ]ámo	fu[ddʒ]ámo	traiámo	traiámo
2	le[ddʒ]éte	le[ddʒ]áte	fu[ddʒ]íte	fu[ddʒ]áte	traéte	traiáte
3	lé[gg]ono	lé[gg]ano	fú[gg]ono	fú[gg]ano	trá[gg]ono	trá[gg]ano

The pattern of stem alternants for Italian *leggere* is the same as what Latin *legere* leads us to expect, except that only the palatalized alternant is allowed in forms where the stem is unstressed (hence the intrusion of this alternant into two plural subjunctive forms). In *fuggire* and *trarre*, however, we find unexpectedly the same alternation pattern as in *leggere*. This pattern has in fact become moderately productive, so as to be extended to a range of verbs where it has no diachronic phonological motivation. But without this motivation, what difference in information content distinguishes *lé*[gg]- from *le*[ddʒ]-, *fú*[gg]- from *fu*[ddʒ]-, and *trá*[gg]- from *tra*-? If there is no such difference (that is, if the distribution of the alternants is merely random and lexically stipulated independently for each verb), then the Principle of Contrast seems clearly violated. However, a striking thing about this distributional pattern is its consistency. An Italian verb either conforms to it *in toto* or not at all. There is no stem-alternating verb in which, for example, the 3rd plural present indicative has the same stem alternant as the 2nd plural rather than the 1st singular. That permits us to say that the difference in information content between the stem alternants is precisely their own distribution. The alternant *le*[ddʒ]- is the default, found in tenses other than the present, so it can be treated as meaning simply ‘read’. The alternant *le*[gg]- is distinguished as meaning ‘read, plus the usual special present tense distribution pattern (2nd and 3rd singular and 1st and 2nd plural indicative, and plural subjunctive)’. How successful such an approach will be depends on whether other seemingly unmotivated stem alternation patterns in other languages display similar consistency (Carstairs-McCarthy 2002). If such consistency turns out to be general, then we have here another instance of morphology displaying its aptitude for synonymy avoidance, even if the kind of difference in ‘meaning’ that it latches on to is wholly intramorphological.

Superficially, the strongest counterevidence to the Principle of Contrast in morphology shows up in inflection class differences. Doesn’t a language violate the Principle if it has (say) two or more genitive singular suffixes, each associated with a different inflection class or classes? Assuming that the membership of these classes is arbitrary (not associated with, say, gender or phonological structure), doesn’t that imply that the distinct genitive singular suffixes have exactly the same information content? That brings us to my fourth example, involving the way in which rival affixes for the same paradigmatic cell convey information about inflection class (Carstairs-McCarthy 1994). In (3) are two hypothetical inflection class systems, represented schematically, one of them labelled ‘possible’ and the other ‘impossible’:

(3)

	Possible inflection class system:				Impossible inflection class system:			
Classes:	A	B	C	D	A	B	C	D
cell 1	<u>p</u>	<u>q</u>	r	r	<u>p</u>	<u>q</u>	r	r
cell 2	t	t	<u>s</u>	t	t	t	<u>s</u>	t
cell 3	u	u	u	u	u	u	u	u
cell 4	<u>v</u>	w	w	w	v	w	w	v

The only difference between the two systems is that the realization for cell 4 in class D is *w* while in the impossible system it is *v*. But that small difference is enough to introduce ‘blurring’ in the technical sense introduced by Carstairs-McCarthy (1994): neither *v* nor *w* identifies unambiguously the inflection class of the lexemes which display it, yet neither is the sole ‘elsewhere’ exponent for cell 4. This blurring is indicated by italicization in (3). By contrast, in the system labelled ‘possible’, there

are no italics. Here, all the affixes are either in underlined small capitals, indicating that they are associated with a single inflection class, or else plain, indicating that they are the sole default affix for the cell in question — the only affix shared by more than one class. In the possible system, Contrast is achieved by a clearcut difference between the default affix *w*, meaning simply ‘cell 4’, and the class-identifying affix *v*, meaning ‘cell 4, class D’. On the other hand, in the impossible system, *v* and *w* are not cleanly differentiable as class-identifier versus default. If inflection class systems always turn out to avoid ‘blurring’ in this fashion, we have here another purely intramorphological mode of compliance with the Principle of Contrast.

Morphology is thus good at avoiding synonymy in ways that serve no extramorphological function, whether communicative or cognitive. The moral for syntacticians is that they should be aware of the possibility that aspects of syntax may be like this too. Commenting on the cross-over of the alimentary tract and the respiratory system, Williams (1992:7) says: ‘This evolutionary short-sightedness has never been correctable. There has never been an initial step, towards uncrossing these systems, that could be favored by selection.’ So what fundamental characteristics of syntax too may owe their existence to ‘evolutionary short-sightedness’ that ‘has never been correctable’? One example, I have suggested, is grammatical functions (Carstairs-McCarthy 1999). In many if not all languages, basic sentence structure incorporates a single clearly identifiable argument that is privileged over other arguments, and is labelled ‘subject’ or ‘topic’. According to my scenario, it is not an accident that in phonology, too, basic syllable structure privileges in various ways one margin (the onset) over the other (the coda). Syntax needs some neural mechanism to operate it, but before syntax existed there was of course no mechanism ideally designed for that purpose. What was available, however, was a neural mechanism for controlling the vocal apparatus during syllabically segmented vocalization. If this was the mechanism that the brain latched on to for syntactic purposes, then much about syntax that is otherwise mysterious — or that would seem mysterious to a Martian observer, not blinkered by being a human language user itself — falls into place.

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