

Book Reviews

Alan C. L. Yu, *A natural history of infixation* (Oxford Studies in Theoretical Linguistics 15). Oxford: Oxford University Press, 2007. xii + 264 pages, ISBN 978-0-19-927938-9, £ 60.00 (hardcover), 978-0-19-927939-5, £ 21.99 (paperback).

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... Toutvoutavoucou ivil invinterverpevellava sonvon voisoua-sinvin envan prevetenvandenvant quivil luivui macharvaichait suvur léves piévieds ...

(Raymond Queneau, *Exercices de style*, Javanais, Paris: Gallimard, 1947)

Given the current dominance of functional topics in typology, it is important to keep in mind that form is equally relevant in studies of linguistic diversity. This was still clear in Joseph Greenberg's times, so it is no surprise that we owe fundamental insights about formal patterns of infixation to Greenberg (1963) and his collaborators Russell Ultan (1975) and Edith Moravcsik (1977), conveniently summarized in Moravcsik 2000. Alan Yu's book is a timely reminder that typology has much to say about infixes. It is a comprehensive survey of many different approaches to infixation from typological, diachronic, and generative perspectives. It is more than a survey, however. Benefiting from the many different points of view taken into account, and based on a large database of infixational phenomena from many different languages, it presents a holistic history of infixation, and at the same time argues for particular theoretical positions.

After a short outline of the general structure of the book (Chapter 1), Chapter 2 ("What is infixation?") introduces descriptive and formal-modeling approaches to infixation. The descriptive approach is used to delineate the scope

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of the study. In particular, infixes are distinguished from morphological processes where internal modification is intrinsic, as in cases of interdigitation in Semitic roots and internal modification of Germanic strong verbs. “Discontinuity in the infixed word is EXTRINSIC since infixes create derived discontinuous morphs by splitting apart meaningful roots or stems that otherwise surface as a unitary whole” (p. 10). In Section 2.2, Yu turns to generative theorizing about infixation. The basic issue here is this: Given the functional elements triggering the generation of a complex form, how do we get from distinct functional units to a form where one morpheme becomes discontinuous (and why does this happen)? The basic assumption of all approaches discussed by Yu is that the morphemes (stems and affixes) are given. This is made explicit in Moravcsik’s 1977 study exemplified in (1) from Zoque where an infix *-y-* marks 3rd person singular possessive: *w<y>akas* [*<3SG.POSS>*cow] ‘his cow’ (infixes are notated in angle brackets following the Leipzig Glossing Rules, see Note 1).

- (1) Zoque infixation of 3rd person singular markers according to Moravcsik (1977: 31, simplified)
- | | |
|----------------------------------|---------------------|
| (Affix, 3rd, SG), (Noun, ‘cow’) | Given |
| (Affix, 3rd, SG) & (Noun, ‘cow’) | By affix ordering |
| <i>y</i> & <i>wakas</i> | By lexicalization |
| <i>w<y>akas</i> | By segment ordering |

However, stems, affix sequences, and their meanings are taken as given by linguists only because they have been told what they are. The first task of formal modeling, apparently not addressed for infixes yet, would be to find out that the given input supports the analysis of infixes and where the stems are in the input (see below).

In discussing generative treatments of infixation, Yu distinguishes between Phonological Readjustment and Phonological Subcategorization, and sides with the latter approach. Readjustmentalist, such as Moravcsik, can argue that the Edge Bias Effect (“infixes predominantly lodge themselves close to one of the edges of the domain of infixation”) is an argument for the underlying nature of infixes as prefixes or suffixes.¹ Similarly, the circumstance that most infixes are not exclusively infixal in the sense that there often are prefixing or suffixing allomorphs (“fake infixes”) may be taken as an argument

1. The alignment of meaning and form in infixation is not only a theoretical problem, but also a practical one in glossing. Interestingly, the dominant glossing standard, the Leipzig Glossing Rules (LGR; Comrie et al. 2008), sides with the readjustmentalist: “Infixes are generally easily identifiable as left-peripheral [...] or as right-peripheral [...], and this determines the position of the gloss corresponding to the infix with respect to the gloss of the stem” (e.g., Latin *reli<n>qu-ere* [*leave<PRS>-INF*] ‘to leave’). The LGR have a very handy solution for glossing infixes, “[i]nfixes are enclosed by angle brackets, and so is the object-language counterpart in the gloss”, which is used throughout this review.

for Phonological Readjustment. These two issues are not challenged by Yu's study but rather are explained differently. The problem, however, consists in explaining why certain prefixes and suffixes are realized as infixes while most are not. Yu criticizes "ethological" approaches, favored especially by Optimality Theory (OT) readjustmentalist for whom phonological constraints take precedence over morphological ones. Put simply, Tagalog *-um-* is infix in *tumata*, because CVCVCV is phonotactically more optimal than anything else, e.g., **umtata*. There are, however, numerous examples where infixation leads to phonological structures which arguably are more complex, such as in Leti (Austronesian) *k<ni>aati* [\langle NOML \rangle carve] 'carving', *(n)i-osri* [NOML-hunt] 'hunting' (Blevins 1999) with CC and VV sequences resulting from infixation, or Pingding Mandarin where the diminutive infix *-l-* leads to consonant clusters not otherwise attested in the language. However, as pointed out by three reviewers of this review, syllable structure optimality is not the only phonological motive for infixing mentioned in the literature; see Crowhurst 1998 for a case of segmental-phonological conditioning in Toba Batak, word-compactness in Lahiri & Plank (forthcoming) contra Blevins 1999,² the "prosodic trough" in Yaka invoked by Hyman 1998, and affixation by place of articulation in Tiene (Hyman 2006). The latter is explained away by Yu (pp. 222–229) as "a matter of output well-formedness satisfaction" (p. 228), which, as he admits himself

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2. Another example for phonological compactness is the Lithuanian (Baltic) *n*-infix (*m* before labials), which has a suffixal allomorph *-st* of different origin. While the *n*-infix lost its productivity in all other branches of Indo-European, it remained productive in Baltic for the formation of present stems of non-volitive inchoative verbs (mostly intransitive). The origin of *-st* is unknown, but it must be much younger than the *n*-infix. It is restricted to Baltic and is not subject to the Baltic sound law $s > š / r, k$ (see *ir-st-a* [dissolve-PRS-3] 'dissolves', *trūk-st-a* [lack-PRS-3] 'lacks') except for the irregular verb *mīr-št-a* [die-PRS-3] 'dies', *mīr-ė* [die-3.PST] 'died', which also has deviant past formation *-ė* rather than *-o*. As Stang (1942: 132) puts it, the Baltic verbal system required that an intransitive formation should be possible for all verbs. Where nasal infixation was impossible for phonological reasons, a new device for intransitivization had to be created. The *n*-infix is inserted in stems with $-VC$ structure except if C is *m* or *n*. Put differently, the infix is used wherever the output is a phonologically well-formed structure in Lithuanian: 3.PRS *šla<m>p-a*, 3.PST *šlap-o*, INF *šlap-ti* 'gets wet'; 3.PRS *alk-st-a*, 3.PST *alk-o*, INF *alk-ti* 'gets hungry' (**anlka* or **qlka* are impossible); 3.PRS *rim-st-a*, 3.PST *rim-o*, INF *rim-ti* 'gets quiet' (**rimma* or **rjma* are impossible). There are numerous complications in details. Before *l*, *r*, sibilants, and *j* and *v*, the nasal infix is realized as vowel lengthening (nasalization in earlier stages of Lithuanian): 3.PRS *bql-a* (\langle *ba<n>l-a*), 3.PST *bālo*, INF *bāl-ti* 'pales'. In some of the forms where infixation surfaces as vowel lengthening (root ends on *s*, *š*, or *ž*), both infixation realized as vowel lengthening and *-st* suffix can be present: 3.PRS *māžta* (\langle *ma<n>ž-st-a*) 'gets small'. Stressed diphthongic units and stressed long vowels are tone-bearing units in Lithuanian. Forms with infixation always have the unmarked circumflex tone (˘). In contrast, stems with roots ending in nasals with *-st* suffix undergo metatony and have the marked acute tone (˙, written ˘ on *i* and *u*): *sén-st-a* [old-PRS-3] 'grows old', *rim-st-a*. Low Lithuanian dialects have extended this *-st* formation with metatony to stems ending on *l* and *r*, where infixation is obscured by the loss of the nasal and vowel lengthening (Senn 1966: 269).

despite of differences from Hyman & Inkelas (1997) in details of the analysis, is a “subcategorizationless morphological derivation” – or, put differently, an exception, not accounted for by his Phonological Subcategorization approach.

A general phonological-motive-for-infixing approach has been advocated especially by Plank (2007: 61): “The task [. . .] is to identify circumstances which licence or indeed require, or also which proscribe, phonological improvements of morphology as individuals are acquiring a grammar, and as members of speech communities may come up with different results”. Thus, as there are numerous ways in which infixation can lead to phonological improvements (and/or phonological complexity), if Yu shows that some infixation patterns are less optimal in phonological structure in some respects this is not enough since they might be more optimal in another respect yet to be identified. However, Plank’s approach is not ideal either. The larger the catalogue of potential phonological optimization strategies – some of them in conflict (simple syllable structure vs. word-compactness) – the more difficult to formulate general testable hypotheses.

In the Phonological Subcategorization approach favored by Yu infixes are but phonological affixes which subcategorize for phonological units rather than morphological ones. Infixation obtains when the edge of phonological alignment does not coincide with a morphological boundary. Thus, according to Yu, infixation is epiphenomenal in that it is just a special case of a more general process. Yu’s theory is based on work by Stephen Anderson and especially McCarthy & Prince’s (1993) General Alignment. In McCarthy & Prince’s approach, however, subcategorization is only invoked if no OT Phonological Readjustment option is available. Yu’s theory has the advantage of presenting a more uniform account to infixation, if at the cost of not being able to account for the edge bias. The edge bias, however, as argued by Yu, has to be accounted for by non-generative components, which is why a holistic approach on infixes is needed.

Chapter 3 elaborates Yu’s holistic approach on infixes. It has three components as shown in (2):

- (2) A holistic theory of infix distribution (pp. 47–48)
 - a. Grammar-internal constraints:
a theory of phonological subcategorization (Chapter 3)
 - b. Grammar-external constraints:³
constraints on morphological learning (Chapter 4);
constraints on morphological change (Chapter 5)

3. I find the term “grammar-external constraints” unfortunate. Morphological learning and morphological change are not grammar-external. Neither do I agree with an anonymous reviewer that “grammar-external” means essentially “functional”. There are both functional and formal approaches to grammar and functionalists are not grammar-externalists.

- c. A theory of interaction between these grammar-internal and grammar-external constraints (Chapter 3)

A central part of the book (Chapter 4) is devoted to investigating the range of possible targets for phonological subcategorization, two kinds of which are identified: EDGE PIVOTS (first consonant, first vowel, last syllable, etc.) and PROMINENCE PIVOTS (stressed vowels, syllables, feet). In order to be learnable, pivots must be salient (Salient Pivot Hypothesis, p. 68). Edges are salient because they are easily identifiable, which is well known from fixed stress assignment (Kuryłowicz 1958, Hyman 1977), and given that prominence is stress, there is a conspiracy in favor of a dominance of the edge bias. The pivot theory neatly accounts for the many cases where infixation and prefixation or suffixation occur side-by-side, such as in Paiwan reduplication (p. 73) where the reduplicant is aligned after the final vowel. While infixation obtains with consonant-final forms (*kamura*<*mura*>*w* ‘a very small pomelo’ from *kamuraw* ‘pomelo [a fruit]’), the result with vowel-final forms is a suffixing pattern (*kupu*<*kupu*> ‘a kind of small tea cup’ from *kupu* ‘tea cup’). The patterns surveyed in Chapter 4 are based on a database of 154 infixation patterns from 111 languages of 26 different phyla and isolates (listed in an appendix to the book). Yu’s sampling principle is “the more the merrier” with a minimal requirement that the level of description in the source must be sufficient to address the main coding categories in the database (p. 74). This unconventional sampling procedure may be justified for Yu’s purposes. It might, however, also be useful to survey infixation from other perspectives. For example, for investigating the genealogical and areal stability of infixation negative evidence (lack of infixation) would be as informative as the presence of the merriest kinds of infixes.

Chapter 5 (“The secret history of infixes”), elaborating a diachronic typology of infixes, is certainly a masterpiece within the monograph. Yu argues convincingly that the edge bias of infixes largely derives from their diachronic origin as prefixes or suffixes and, thus, that the diachronic typology is directly relevant for its synchronic typology (see also Moravcsik 2000: 549). Based partly on previous findings by Ultan (1975), Yu shows that infixes have four kinds of known diachronic sources: metathesis, entrapment, morphological excrescence, and reduplication mutation. Interestingly, the four types of diachronic sources often entail different synchronic structures, so that the question arises whether infixes are a uniform kind of phenomenon.

Metathesis (Chapter 5.2.1) is restricted to a class of metathesizable segments (labials, palatals, pharyngeals, laryngeals, liquids, and rhotics) and can “transpose” only one segment at a time; *y* in (1) from Zoque above is a case in point. Yu shows that metathesis is often not based on reordering, but rather originates in coarticulatory effects (Lepcha $C<j>V < *s-CV$, Tzutujil $CV<?>C < *CVC-$

b'), which makes this kind of infixation look not all that different from umlaut as in Germanic and other similar kinds of phonologization.

Entrapment (Chapter 5.2.2), the stranding of morphemes between fossilized composites of an affix and a root, does not usually lead to infixation proper, but rather to “bipartite stems” (see below). Characteristically, the entrapped affixes are person markers (e.g., Hua *ha<nd>apai* [*<1SG>tell*], *ha* is reconstructed as a prefix, but has no meaning of its own synchronically), the composites are verbs more often than nouns, and there is an arbitrary lexical class of verbs with entrapped person markers besides another verb class where the markers are prefixal or suffixal (Stem-class effect, p. 151).

Morphological excrescence (Chapter 5.2.4), the emergence of an affix without an immediate historical antecedent, leads to non-denotative infixes (expletive, distastefulness, language games or ludlings), often having prominence pivots, such as the English *ma*-infix (*saxo<ma>phone*, see also Kaye 1989) which Yu calls “Homeric infixation” (after a character in the American TV series *The Simpsons*).

Finally, reduplication mutation (Chapter 5.2.3) is left as the only candidate for a more general source for infix creation. An element of reduplication, be it the base or the reduplicant, is dissociated from reduplication by various phonological processes, such as the Trukese infix and prefix *Vkk*, originating from #CVC-reduplication due to a sound change of initial **k > w*. Reduplication mutation is “generally difficult to detect”, since “the resultant infix not only may be unfaithful to its historical antecedent, but also might not be reduplicative at all. This gives the impression that the resultant infix sprang out of nowhere” (p. 171). This is especially convincing since the author has prepared us for a close connection of reduplication and infixes by discussing a great many examples of infixing reduplication in Chapter 4. The development from reduplication to infixation is also interesting because it is unidirectional (p. 171), being reminiscent of functional phenomena in grammaticalization.⁴ It requires further research to see whether infixes mark anything that other affixes or also reduplication can mark, and whether infixes mark some things significantly more often than other affixes or reduplication do. Reading through all the examples of infixation assembled by Yu I have the impression that there might be a bias, not only towards derivation in general, but towards certain types of functional categories such as nominalization, intensive, frequentative, number (especially verbal number), and diminutives.

4. See also Zuraw’s recent study on the Fleischhacker splittability hierarchy of consonant clusters in Tagalog infixation, attesting to the relevance of hierarchies in morphophonology (Zuraw 2007).

Yu admits that there is a considerable residue of infixes with no known antecedents. In some language families certain infixes have always been infixes as far as we can go back (-*um-* and -*in-* in Austronesian; the present-stem nasal infix in Indo-European, still thriving in Lithuanian, see also Benveniste 1935: 160). For such always-been-there infixes it is difficult to reconstruct a source. More relevant, however, is that the extraordinary diachronic stability of some infixes rather speaks against them being exotic anomalies.

It would be interesting to see in an areal-typological study whether the four different diachronic types of infixes add up to a uniform synchronic phenomenon at all. Delimitation by a descriptive definition is only a starting point; it can only be shown by a world-wide typological survey with a more traditional sampling method whether phenomena are internally coherent. That there can be surprises has been demonstrated by Veselinova's recent monograph on suppletion where she shows that suppletion in verbs is not a single coherent phenomenon from a typological point of view (Veselinova 2006).

The final Chapter 6 discusses some residual issues: fake vs. true infixation, infixation in language games, endoclysis, and features and subcategorization. The discussion of language games and disguised speech shows that something like infixes is a possibility in virtually any language. Still, such patterns would seem special insofar as not all speakers of the disguised or played-with languages know them and can manipulate them. This is particularly obvious in the case of an infixation pattern -*hVlefVC-* attributed to Latvian and exemplified with two words which are German rather than Latvian (p. 199). (The phonemes /x/ (<h>) and /f/ do not occur in genuine Latvian words.) Latvian native speakers whom I showed the examples could not make any sense out of this. Also, the evidence for constraints on morphological learning which comes from infixation patterns restricted to language games and secret languages should naturally be taken with special care.

A further "marginal" domain of language structure where infixes thrive in some languages are ideophones. Thus, in Ilocano, the sound symbolic infixes -*ar-*, -*an-*, and -*ag-* are "often used with bisyllabic roots of a reduplicated CVC sequence to indicate the continual aspect of the action or sound associated with the referent specified in the root", e.g., *t<ar>ektek* 'cry of rooster, change of voice in puberty' (Rubino 2001); or in Lithuanian, a number of ideophones can be derived by other ideophones by infixing *l* or *r* and repeating the stem vowel: *càp(t)*, *c<ar>àpt* 'grabbing motion'; *dziñ*, *dz<il>iñ* 'clanking falling' (Ambrazas (ed.) 1997: 444).

These and other "marginal" functions of infixation suggest that infixation often has stylistic connotations. Discussing infixation patterns in Khmer, Haiman (2004) speaks of decorative and artistic infixation: "In particular, the devices of repetition and of infixation seem at least to have not only a (typologically unsurprising) range of referential functions, but also seem to be often employed

purely for the hell of it, or for no cognitive reason whatsoever.” While there is no doubt that some infixes have stylistic functions, it is not yet clear what this means exactly for their holistic natural history.

Of particular importance is Yu’s observation that there are almost no infixes which are true infixes in that there is an intrinsic requirement preventing the phonological affix from appearing peripherally. Some infixes, such as intensive *-eg-* in Yurok, invariably happen to appear as infixes just because the affix appears after the initial consonant and there are no vowel-initial verbs. Still, this is a “fake” infix according to Yu. A true infix – the only one discussed – is English *ma*, subcategorizing for a disyllabic trochaic foot, but not allowed to occur word-finally: cf. **oboema*, where the resulting form is *obamaboe* instead. According to Yu, this has to do with the fact that *ma* originates word-internally.

I would now like to elaborate on two points that have come up in the discussion above: (i) “infixation” by entrapment and (ii) the givenness of morphemes in theories about infixes.

“Infixation” which has developed by entrapment, where characteristically the entrapped affixes are person markers and where there is a “stem-class effect”, is not really infixation: in such cases we are dealing with BIPARTITE STEMS (Bickel & Nichols 2003, 2007; Bickel et al. 2007).⁵ In bipartite stems, the host consists of two elements, none of which has a meaning of its own, but the split nevertheless occurs at a certain lexically determined position irrespective of whether or not an entrapped morpheme is realized in that position. Consider, for example, the Kuot (isolate, New Ireland) verbs *aga-lie* ‘take a rest’, *it-amu* ‘finish’, *pu-ro* ‘start’, *muli-ba* ‘be ashamed’, *te-aba* ‘start’, *te-nie* ‘get down’, taking entrapped (“infixated”) subject markers, while other Kuot verbs have subject prefixes or subject suffixes (Lindström 2002: 142, Chung & Chung 1996). The parts have no meaning of their own and the position of the subject markers cannot be predicted. In contrast, in infixation, the position in the host where the infix is inserted is not determined by idiosyncratic properties

5. The terminology is rather unfortunate. The term “bipartite stem” has first been introduced by Jacobsen (1980) for Washo, and has been extended by DeLancey in various publications (1999 etc.) to languages in the bipartite stem belt of Northern California and Oregon (an area crossing genetic boundaries between Northern Hokan, Plateau Penutian, and Maidu) to designate combinations of “lexical prefixes” and “locative-directive stems”. As these labels suggest, many Jacobsen-DeLancey bipartite stems can be analyzed into morphemes with meanings of their own and the fact that they are discontinuous is no part of their definition. While some, but not all, bipartite stems in the Jacobsen-DeLancey sense may be bipartite stems in the Bickel-Nichols sense, most Bickel-Nichols bipartite stems are not Jacobsen-DeLancey bipartite stems. It would probably be better to use another term such as “discontinuous stems”. Wherever I use “bipartite stems” outside of this note I mean bipartite stems in the sense of Bickel-Nichols.

of the host but rather by phonological properties of the host (prominence pivots). It is thus rather doubtful whether entrapped infixation is always extrinsic in Yu's terms. As seen in (3), bipartite stems have also made their way into the Leipzig Glossing Rules (LGR; Comrie et al. 2008), which suggest a different glossing from infixes, namely to either repeat the gloss for the stem or to use a special label STEM for the second part. The example given in the LGR from Lakhota exhibits a property of bipartite stems that make them look rather different from infixation. More than one morpheme can be "inserted" at a time and the "inserted" elements can have more phonological substance than the host. Bipartite stems (and entrapment) are thus the least phonologically-constrained of all infixoid types.

- (3) Lakhota
na-wičha-wa-xʔu
 hear-3PL.UND-1SG.ACT-hear
 'I hear them.' (Comrie et al. 2008: Rule 8: ex. (24))

Lakhota may be intermediate between bipartite stems and infixes because Lakhota bipartite stems tend to have a CV initial part and may thus arguably have a pivot of phonological subcategorization (see Albright 2000). This does not seem to hold, however, for such languages as Dargi, Lak, and Kuot. The concrete relationship between infixes and bipartite stems needs further research, with particular attention being paid to the questions to what extent languages with bipartite stems have pivots in the sense of Yu and whether languages with entrapped person markers show tendencies to develop pivots.

One of Yu's arguments for his pivot theory of phonological subcategorization is morphological learning: "[P]honological pivots must be perceptually and psycholinguistically salient, where salience may include factors such as ease of recoverability and facilitation in language processing and lexical retrieval" (p. 67–68, with a MORPHOLOGICAL LEARNING ALGORITHM invoked on p. 67). While the pivot theory may be well suited for learning and processing as soon as morphological constituents have been identified, it is of little use for the first part of the story: When do children start finding out that their future native language has infixes? This question is not addressed at all in this as well as most other works on infixation. An exception is Dressler (2005: 14), who mentions that infixes are acquired late in Tzeltal and Lithuanian, but this need not be representative for highly infixing languages, given the marginal status of infixes in Lithuanian. Infixes obscure the structure of word forms until learners have discovered how they work.⁶ The same applies to prefixes and suffixes, but to a lesser extent. Once learners have managed to make good guesses how to

6. Consider also the role infixes play in many secret languages.

segment words into morphemes without knowing at this stage which elements are stems and which are affixes, stems can be detected directly with suffixes or prefixes being what is left over when stems are subtracted. This is not possible with infixes. Infixes have to be identified first and what is left over is the stem. One would therefore expect that at least some constraints on infixation are constraints on learnability (for computer-modeled infix learning in Lakhota see Albright 2000 and Albright & Hayes 1999).

What do infixes have to be like so that learners can discover that there ARE infixes in the input they are exposed to? This question might benefit from taking an UNSUPERVISED MORPHOLOGICAL LEARNING perspective, as first pioneered by Harris (1955) and further developed by Goldsmith (2001). At this point, a question asked by Moravcsik (1977: 112) becomes important: What are the similarities of infixes within any one language? It is probably no coincidence that all infixes, e.g., in Tagalog, Chamorro, and Sundanese have a length of two phonemes on the surface.⁷ Infixes, it seems, tend to be more consistent in their length than prefixes and suffixes.⁸ It does not seem to be common for languages to have prefixes and especially suffixes with constant length. While the length of infixes does not matter much for the generative component of a grammar, it is likely to be crucial for acquisition. My own work in algorithmic morphology suggests (i) that infixes can be more easily discovered if they have constant length, and (ii) that infixes with a length of two phonemes can be more easily discovered than infixes with length one. Infixes in small corpora were identified more easily in languages where they are highly frequent (e.g., Tagalog, Sundanese, Dakota vs. Cebuano and Lithuanian), and infixes were not initially distinguished from non-initial prefixes and non-final suffixes, such as Sogb *-em-* irrealis and Turkish *-in/-in-*, allomorphs of the 3rd person possessive before case suffixes. This follows from the fact that infixes have to be identified before stems. Furthermore, in Tagalog and Chamorro the infix discovering algorithm also discovered frequent sequences of two phonemes involved in CV-reduplication (Wälchli 2007). This suggests that infixes are not an isolated phenomenon from the point of view of language learning, and that the similar surface form of various infixes, and of infixes in combination with other morphological elements (such as reduplication sequences), can facilitate the acquisition of infixes. Infixes, or at least some infixes in some languages, can be acquired before stems are identified and without any reference to semantics, simply by considering recurrent phonological patterns in types of word forms occurring in a corpus.

7. Note, however, that *a* is the epenthetic vowel in Sundanese (David Gil, Uri Tadmor, personal communication), which is why the infix *-ar/al-* might derive from a monosegmental infix.

8. Many languages lack sequences of prefixes or infixes consisting of one phoneme. But infixes are probably more consistent in length than prefixes.

What we can learn from this is that infixes have their specific environment in every particular language, which might be relevant for the morphological learning algorithm. We can also learn from it that characteristic properties of infixes exist for different reasons, some due to acquisition, others to the generative component, all of them also having a diachronic rationale, as shown by Yu.

Alan Yu writes that “[o]ne of the main goals of this book is to provide a bridge between the line of linguistic research that emphasizes the synchronic forces operating in language and those that recognize the force of diachrony that help shape them” (p. 6). With his holistic approach to infixes, Yu has indeed provided us with a well-constructed bridge which will bring together linguists interested in the fascinating topic of infixes for years to come and help them realize that particular theories are only particular ways of looking at particular phenomena. While I hope to have identified a few further perspectives on infixes in this review, this does not mean that the book would be incomplete in any way. Rather, Yu’s monograph is an invitation to further expansion. Branching out in yet further directions, I hope that future infix research will follow the way of holism paved by Alan Yu.

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Abbreviations: 3 3rd person; ACT actor; IMPV imperfective; INF infinitive; NOML nominalization; PL plural; PRS present; PST past; SG singular; UND undergoer.

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Adele E. Goldberg, *Constructions at work: The nature of generalization in language*. Oxford: Oxford University Press, 2006. vii + 280 pages, ISBN 978-0-19-926851-1, £ 70 (hardback), ISBN 978-0-19-926852-8, £ 17.99 (paperback).

Reviewed by N. J. ENFIELD, Max Planck Institute for Psycholinguistics

The ‘construction’ has long been a key weapon in the grammarian’s almost Quixotic struggle to describe linguistic systems, a project undertaken today with conceptual tools developed a century ago by pioneers like Boas, Saussure, Sapir, and Bloomfield. Our workaday practices have evolved with technology, but the *modus operandi* remains unchanged: collect and transcribe a representative corpus, then exhaustively account for everything that occurs in it. This account will comprise (i) a list or inventory of structures that each have to be learned, and (ii) a set of rules or generalizations by which items in (i) may be combined to yield the token structures observed in the corpus (and in principle to yield further grammatical sentences *ad infinitum*).

The core theoretical contention of CONSTRUCTION GRAMMAR is that this list-rule model is wrong, because the contents of so-called lists and rules are instances of the same thing: form-meaning mappings at the type level. Langacker (1987) put it this way when he proposed that rules may be re-cast as symbolic form-meaning pairings called “constructions”. In this sense of construction, form is not specified in phonological terms but more abstractly as arrangements of types of linguistic item, where these types are defined by relatively schematic semantic specifications inherent in open constructional slots, called “elaboration sites”. Such a site may be instantiated by any linguistic element whose meaning is compatible with more general semantics of the slot. In other words, these slots are offices for which lexical and similar items may qualify

to serve as incumbents (Fillmore 1988: 41). The resulting process of semantic unification is wholly productive (cf. Chafe 1970, Wierzbicka 1988).

Goldberg's new book *Constructions at work* builds on the insights of Langacker and Fillmore, adding many more insights of her own, along with those of fellow travelers (see Goldberg's Chapter 10 and Croft & Cruse 2004: Chapter 10 for surveys of the construction grammar family of approaches). She pays particular attention to the problem of language learning and brings findings of experimental psychology and its methods to bear on a list of questions which linguists have been unable to settle empirically. The book marks a milestone in Goldberg's brilliant career and makes a timely contribution to the ongoing visibility of construction-based approaches to grammar.

Goldberg defines the construction as a form-meaning pairing, grouping together two kinds of structure which linguists traditionally keep distinct: words and grammatical constructions. Yet the term "construction" is used in the book with two senses: (i) more broadly, any "form meaning-pairing", including both words/morphemes and grammatical constructions, and (ii), more narrowly, any grammatical construction as opposed to the words/morphemes that appear in it. In the classical form-meaning pairing that Saussure described, form is specified in phonological terms. Recognizing word/morpheme forms is a process of taking phonetic tokens to stand for phonological types. By contrast, the form of a grammatical construction is further from the surface. In mapping constructional tokens to constructional types, a listener must identify phonologically defined words/morphemes before he can identify the construction. Two tokens of a construction may have little or no phonological form in common, and so the sense in which they have "identical form" needs to be clarified. Can we treat words and grammatical constructions as literally the same type of entity? Or are the differences significant enough to warrant keeping them distinct, as traditional linguistics would suggest we do? The strong proposal to treat words/morphemes (formally defined by phonology and distribution) and grammatical constructions (formally defined by class and configuration) as a single type raises interesting questions for research. To be concretely instantiated, a grammatical construction depends on the phonologically-defined morphemes it incorporates. What, then, are the relations of dependency between form-meaning pairings of the two types? Grammar is said to be "constructions all the way down" (p. 18). How far down is down? Are there no constraints on the number of levels? Fleshing out these questions will help to convince many who are well-disposed to a construction grammar approach yet still wonder whether it is more than a useful re-description of the basic list-rules model.

Goldberg contextualizes her work within the core concerns of linguistic science since the 1950s. She begins by setting out the same desiderata that legitimized generative linguistics' contribution to founding the cognitive sciences: We need to understand language as a cognitive system, we need to understand

it as a generative system, and we need a non-trivial account of how language is learnt by children. Goldberg asks the biggest questions going: What is language? What is it like and why is it like that? How is language psychologically represented? How is it learnt? In the tradition of her home discipline of Cognitive Linguistics, she proposes that the answers are in cognitive capacities not specific to language.

The book's sustained orientation to Chomskyan linguistics, concerned both with defining what is shared with Goldberg's approach and what is not, is familiar from functional and cognitive linguistics generally. But readers of Bloomfield 1933, for example, may view construction grammar less as a radical alternative to Chomskyan linguistics, and more as a theoretically progressive, empirically grounded development of good old structuralism. Bloomfield's work shows striking similarities to construction grammar. He argued, for instance, that grammatical arrangements have meanings, for which he proposed a term: the epimeme. Despite being widely cited for semantic pessimism, Bloomfield treated grammatical structures in terms of their meanings (e.g., "actor-action", "goal-action", "instrument-action", "place-action"; Bloomfield 1933: 173–174). Further, his ideas on language learning and productivity are consistent with arguments laid out by Goldberg in Part II of her book (and in more detail in related work such as Tomasello 2003). Bloomfield (1933: 276) proposed that grammatical patterns allow analogies by which we may create novel utterances, remarkably prescient given what we now know about the importance of analogical thinking in general cognition (Gentner et al. (eds.) 2001; cf. Langacker 1987: 446–447 on the effective equivalence of analogy and schema-based constructional unification). Finally, the importance of frequency – critical to Goldberg's compelling account of learning in Part II – was not lost on Bloomfield either. Anticipating an entire movement in corpus-based linguistics, he wrote, "fluctuations in the frequency of glossemes play an important part in the changes that occur in every language" (1933: 277).

Of course, Goldberg's version of grammar differs from pre-war structuralism in important ways. Most obvious is a modern foregrounding of cognition in a scientific account of language. Bloomfield himself was ambivalent about the role of psychology in linguistics, but then contemporaries like Sapir could not have been more explicit that psychology mattered for language (cf. also Peirce, Vygotsky, and Mead, among others). Once we see the passing Chomskyan phase as a phase and not as the origin of our discipline's most important pursuits, we will situate modern insights such as those of construction grammar within a genuinely cumulative science.

It is no doubt Chomsky's dominance in linguistics that motivates Goldberg's sustained efforts in Part III to answer, or pre-empt, challenges for constructionist approaches to handle some of the more recalcitrant phenomena dear to generativist hearts. When a functionalist proposes that language can

be learnt without domain-specific knowledge, a voice in the audience will ask “What about subjacency?”, “What about subject-auxiliary inversion?”, “What domain-general cognition could possibly account for these?”. Goldberg delivers a sustained head-on attack on these lingering doubts, a valuable laying-out of the kinds of answers a functionalist should have up his sleeve. But the arguments need upgrading to knock-down status: my feeling is that skeptics will remain skeptical. Still, Goldberg provides ammunition, usefully bringing current arguments together in one place, and breaking ground in the ongoing wrestle with nativism. The questions raised should drive many research projects to come.

Linguistic typological diversity receives relatively little attention in the book, although Chapter 9 concentrates on proposed universals and possible explanations in terms of general cognitive principles. Croft’s version of construction grammar (Croft 2001) is a sustained treatment of just this theme, and Goldberg’s Chapter 9 is limited in scope by comparison. She nevertheless provides assurances that construction grammar can straightforwardly handle great structural diversity. Goldberg implies that her approach is closer to Croft’s than it is to other versions of construction grammar, but this is so only up to a point. While Croft’s path leads him to conclude – radically – that there are no crosslinguistically stable grammatical or other structural categories (cf. also Haspelmath 2007), Goldberg wants to maintain a “more traditional” position as to the comparability of languages (p. 226). How this is to be done remains to be seen. Comparability will ultimately have to be anchored in semantic structure (Haspelmath 2007: 127–128), but Goldberg is surprisingly non-committal as to how meaning should formally be represented, and thus how it might be directly comparable across languages (see Goddard & Wierzbicka (eds.) 2002 for proposals). This is in line with Goldberg’s general backing away from formalizing her version of construction grammar, in contrast to kindred approaches which are busy trying to narrow in further on making the nature of constructional unification as explicit as possible.

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David A. Peterson, *Applicative constructions*. Oxford: Oxford University Press, 2007, 293 pages, ISBN 978-0-19-927092-7, £ 60.

Reviewed by FERNANDO ZÚÑIGA, Universität Zürich

This book – David Peterson’s revision of his Berkeley doctoral dissertation on the subject (Peterson 1999) – is a substantial contribution to linguistic typology on at least the following three grounds. First, it is a principled and illuminating investigation of applicative constructions, a phenomenon found in a considerable number of areally and genetically unrelated languages. Second, together with other publications based on fieldwork conducted by the author (Peterson 1998, 2003), it represents a welcome addition to our knowledge of the morphosyntax and some discourse patterns of Hakha Lai, a Kuki-Chin language of the Tibeto-Burman family, primarily spoken by some 100,000 people in Myanmar, India, and Bangladesh. Finally, the book convincingly argues, using applicative constructions as a case study, that any typological inquiry ought to address at least three dimensions for it to “yield an integrated picture” (p. 3): (i) a synchronic morphosyntactic account of the pragmatic status of the phenomenon at issue, (ii) an account of its sources and evolution, and (iii) other typological features of languages that correlate with its presence or absence.

Chapter 1 is a four-page introduction to the topic of study and the scope of the book. Even though this chapter was intended to simply orient the reader, some terminological discussion might have been useful here – at least in the following two respects.

First, the author’s broad characterization of applicative constructions (“a means some languages have for structuring clauses which allow the coding of a thematically peripheral argument or adjunct as a core-object argument”,

p. 1) certainly has a long-standing history and allows him to treat two different constructions as extremes between which individual constructions found in given languages may fall (cf. Comrie 1985 for the classic reference and Dixon & Aikhenvald 2000 and Haspelmath & Müller-Bardey 2004 for more recent accounts). Strategies that derive transitive verbs from intransitives in such a way that an originally peripheral argument can appear as object (e.g., German *wir bitten um Hilfe* vs. *wir er-bitten Hilfe* ‘we ask for/request help’) have been typically labeled applicatives. On the other hand, those constructions that apply to transitive verbs and do not actually increase their valence but rather rearrange the non-subject arguments in such a way that the original adjunct becomes object and the original object becomes adjunct (e.g., German *wir laden Heu auf den Wagen* ‘we load hay onto the wagon’ vs. *wir be-laden den Wagen mit Heu* ‘we load the wagon with hay’) have often been described as applicatives as well, but some scholars have proposed alternative terms for them. Kulikov (forthcoming) is the most recent example I am aware of; he uses the labels 2/3 PERMUTATION OF LOCATIVE ALTERNATION to cover the latter strategies and restricts the use of APPLICATIVE to the former. (By the same token, Kulikov calls strategies that promote adjuncts to indirect object status BENEFACTIVES and reserves the labels already mentioned for constructions that promote to direct object status.) Along related but somewhat different lines, Lehmann & Verhoeven (2006) propose a distinction between (i) applicatives as found in Bantu languages, which may be either valence-increasing or rearranging, but typically and productively turn adjunct instruments/comitatives and beneficiaries into objects, and (ii) EXTRAVERSION, which is strictly and non-productively valence-increasing and prototypically targets patients, themes, and even stimuli for their licensing (not their promotion) as objects. Even though some of the technicalities related to these terminological issues are dealt with in Chapter 3, I think even two or three pages at the outset devoted to alternative labels like the ones mentioned above and the analytic rationales behind them would have been an important addition in order for the book to be a truly authoritative reference work on applicatives – a description that does fit most other parts of the book.

The second terminological note, of a historical nature, that I missed in the introduction was how the label APPLICATIVE as originally used by Carochi for Classical Nahuatl in the 1600s compares with the use of the term in some of the languages under scrutiny in the rest of the study. In fact, there are no examples from Nahuatl in the book, although the author does mention Uto-Aztecan languages a number of times (there is an example from Tepehuan on page 56, and Shoshone is the Uto-Aztecan language Peterson chose to include in the sample for his study of correlations). Suffice it to note here that the first set of Nahuatl examples used by Carochi to introduce the section on *verbos aplicativos* (Carochi 2001: 240–243) includes both intransitive and transitive verbs

marked with a suffix *-lia* which have a clear bene-/malefactive reading, and represent cases of arguments licensed to appear in the clause as objects (and can therefore be marked on the verb, for example) that are not listed as occurring as adjuncts with non-applicative counterparts. Moreover, Carochi notes that some applicative verbs have “deviant meanings” (Carochi 2001: 245), e.g., *nemi* ‘live’ vs. *nemi-lia* ‘consider/deliberate something’ and ‘die’ in both a simple (*miqui*) and an honorific (*miqui-lia*, “reverential”) version. In my opinion, at least some discussion, not only of Nahuatl applicatives, but also of Carochi’s original presentation would have been relevant.

Chapter 2 (pp. 5–39) shows the way applicative morphosyntax works in two languages: Bukusu (Bantu; Kenya) and Hakha Lai. Since the phenomena found in Bukusu are similar to what has been reported for other Bantu languages in the literature (it features a benefactive/instrumental applicative verbal suffix *-IL* and two locative applicative enclitics =*xo* and =*mo*), this first case study can be regarded as a general introduction to applicativity and some of its possible effects on constituent order, marking morphology, passivization, and relativization of both “base objects” and “applicative objects”. The case study on Hakha Lai presents in considerable detail a rich system of applicative constructions (the language has the following applicative suffixes, some of which might be unique or at least very infrequent: benefactive/malefactive *-piak*, additional benefactive *-tse’m*, malefactive *-hno’*, instrumental *-naak*, comitative *-pii*, prioritive *-ka’n*, and relinquitive *-taak*), as well as some of the relevant object properties, viz., agreement, constituent order, reciprocal coreference, and purposive control.

Chapter 3 (pp. 40–82) is a survey of parameters along which applicative constructions vary crosslinguistically: the semantic role of the applicative object; the optionality vs. obligatoriness of the constructions; those formal properties of objects acquired by applicative objects (and those properties retained by base objects); the transitivity of the verbs from which applicatives can be derived; and the interesting isomorphism between applicatives and causatives found in a number of languages. The last 15 pages of the chapter are devoted to the treatment given to applicatives by different theories of syntax, viz. Relational Grammar, Government and Binding/Principles and Parameters, and Lexical-Functional Grammar, with some brief closing remarks on more recent developments, e.g., Minimalism. Appendix C (pp. 257–259) is a questionnaire for fieldworkers and specialists in particular languages wishing to describe applicatives along the lines surveyed in Chapter 3.

Chapter 4 (pp. 83–122) investigates the discourse function of applicative constructions in Hakha Lai and Wolof (West Atlantic; Senegal and Gambia) based upon two different approaches: topic continuity and topicworthiness. (Appendix A on pp. 236–244 is an account on how these two approaches were applied to the task at hand in Hakha Lai; such an explicit section is not always

found in studies that deal with similar issues and is a very welcome methodological feature indeed.) The literature has mentioned two possible functions of applicative constructions, viz., (i) indicating that “the entity the construction refers to has a greater discourse salience or topic continuity than would otherwise be expected of it” (p. 83), and (ii) making otherwise peripheral arguments accessible to operations normally accessible only to direct objects, like passivization and relativization. The author’s main finding is that, in narrative discourse, these two motivations differ as to how operative they are: while the former motivation appears to apply basically to animate applicative objects, the latter seems to hold true for inanimates. The importance of animacy in this respect has been recognized in former studies; cf., e.g., Donohue 1999, an in-depth study of *Tukang Besi* (Austronesian; Sulawesi), which Peterson considers “one of the most exhaustive synchronic studies of an applicative system to date” (p. 59), and Valenzuela 2003, which “provides a comprehensive treatment of applicative constructions in Shipibo-Konibo” (Panoan; Peru) (p. 60).

Chapter 5 (pp. 123–171) addresses different grammaticalization and lexicalization paths along which applicatives may arise and develop. Based upon evidence from a wide variety of languages, Peterson claims that the usual sources of applicatives are either verbs or adpositions; either these verbs or adpositions or these very applicatives (more precisely: “transitivizing applicatives”) can turn into “continuity-motivated applicatives” and then further become topicalizers or subordinators, which in turn may develop into nominalizers. Pages 160–169 are devoted to a very interesting topic that is also of paramount importance for typology, viz., the etymology and characterization of some of the well-known Tagalog “focus” or “topic” affixes <un>, <in>, -in, and -an – in fact, they deal with the reconstruction of parts of the morphology of Proto-Austronesian in general. Basically, the author proposes an alternative to the standard account of these affixes as nominalizers that were later reanalyzed as voice markers for main clause verb forms: there is evidence suggesting that both “location topic” *-an and the instrumental nominalizer *Si- once were applicatives, and Peterson attempts to make such a development path (via attributive clauses) plausible.

Unfortunately, it is only rather briefly mentioned (one page) that transitivizing applicatives can become lexicalized. The usefulness of this chapter notwithstanding, a more detailed account of lexicalization and its role with applicativity – Germanic suffixes like *be-*, *er-*, and *ver-* come to mind here, cf. Swedish *de be-bygger området med hus* ‘they build up the area with houses’, German *die Seele be-rühren und den Körper er-fahren* ‘to touch the soul and experience the body’, Dutch *Jan ver-stuurde zijn vrienden uitnodigingen voor het feest* ‘Jan sent his friends invitations to the party’, and English *all of these be-gin to be-get* – would have made the chapter even more useful.

Chapter 6 (pp. 172–230) explores structural correlates of applicative constructions as found in a convenience sample of 100 languages, half of which have such constructions. The sample covers the following geographic areas: Papua New Guinea, Africa, South America, North America, Central America, South and Southeast Asia, Eurasia (comparatively underrepresented because applicatives appear to be rather rare in this area), and Australia. Among the main findings are the following: (i) whereas benefactive and comitative/instrumental applicatives can be the only applicative constructions in a given language, locative and circumstantial applicatives imply the presence of the former; (ii) applicative constructions preferably appear in languages conforming to alignment types other than accusative; (iii) benefactive and circumstantial applicatives correlate positively with the presence of passive constructions; and (iv) languages with applicatives that apply to inanimates tend to restrict the access of the latter to relativization strategies.

As to the fact that the languages in the sample were not randomly selected, the author observes that “at this point, any sample of languages with or without applicative constructions will have to be at least somewhat of a convenience sample” (p. 173), because both the quality of available reference materials and the inconsistent way applicatives are treated in descriptive studies make it difficult to decide how to categorize a given language. Several methodological comments could be made here, and readers of this journal might be familiar with some of the problems that arise in this respect (cf. the debate in Volume 10(1), especially Widmann & Bakker 2006), and may formulate working hypotheses as to what qualifications of the author’s claims would be in order due to his sampling techniques and the kind of tests he performs on the data even before reading Appendix B (pp. 245–256), which describes in detail how the sample was constructed. However, I think technical issues like these deserve separate treatment in articles specifically devoted to the application of quantitative methods to typological studies. I believe Chapter 6 is a sound and solid take on the most important preliminary conclusions the author can reach based upon his convenience sample.

Peterson’s book, in spite of the few and minor shortcomings mentioned, is an outstanding contribution to typological studies: it provides a thorough description of applicative constructions in individual languages and an accessible comparison of different theoretical approaches, thereby drawing a picture of a complex and fascinating phenomenon that is as complete as the linguistic profession is currently able to draw. In addition, the book will be an indispensable reference work for linguists interested in applicatives and related issues in lesser-known Tibeto-Burman languages.

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