Is the optimal affix polyfunctional?

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1. Introduction

Usually one assumes a 1:1 mapping between form and meaning as optimal: one affix – one meaning (or function). Such a situation could require a large number of different affixes, and insofar it is memory-expensive. An open question is how the many different affixes may have evolved. One possible source of affixes is redefinition of phonological alternations. In that case one would rather expect that the number of possible affixes is small; the same phonological form could have emerged in different categorical surroundings.

As we know, inflectional affixes are often underspecified, for instance, one affix stands for all plural person, or for 1st and 2nd, or 1st and 3rd person. Underspecified affixes are mapped onto a family of *similar* functions; which of these functions is meant in a particular application is further regulated by the context. We would not speak of polyfunctionality here.

In general, affixes are expensive, both for processing and memorizing. From the point of economy, therefore, fewer affixes would be better than more affixes, provided that they cover the same set of functions. This means that some of the affixes have to be polyfunctional. If the particular function of an affix is determined by the context, extra processing or memory costs are not needed.

Sometimes it might be better to add only a phonological feature rather than a full affix. Ablaut, e.g., is a very common way by which the syllable structure of a root remains unaffected. One of the finest examples is the verb *werfen* 'throw' in German with 5 different ablaut vowels. Some of these vowels are predictable but most ablaut forms are memorized in modern German, which is costly for the memory but still effective for processing.

(1)   Ablaut in the German verb root /vɛrf/ 'throw'

vɪrf	1sg/3sg present	vɔrf-n	past participle
vɪrf	imperative	vʊrf	nominalization
varf	past	vʏrf	conjunctive

In general, ablaut may have multiple functions, such as tense-aspect, person-number, and category change (e.g., nominalization). In the verb inflection of Newar (Tibeto-Burman) the Ablaut u > i marks plural (less systematic in the 3rd person).

(2)   Past forms of the verb *bon* 'read' in Dolakha Newar (Genetti 2007: 159)

	Singular /u/	Plural /i/
1	bon-gu	bon-gi
2	bon-mun	bon-min
3	bon-ju	bon-hin

Reduplication can be better than the addition of affixes that bear their own melody because less phonological information has to be stored. Reduplication often serves a general purpose, which more or less is iconically connected with the fact that parts of a word are iterated. "More of the same form stands for more of the same meaning". Therefore, one of the same operation can have different functions, dependent on whether it applies to verbs, nouns or adjectives. That is, reduplication possibly adds a whole set of functional features. More meaning of a verb can refer to iterative, continuative, progressive, frequentative or

habitual aspect. More meaning of a noun can refer to plural, distributive or augmentative, and more meaning of an adjective can mean a more intensive quality. (To the opposite, one also finds the diminutive and attenuative function.) Remarkably, reduplication often also induces category change such as nominalization, adjectivalization, etc. As Bakker & Parkvall (2005) remark, reduplication is only rarely found in pidgins but is a very common means in creoles. This suggests that reduplication is triggered by the need of introducing morphology rather than by merely psychological factors such as emphasis.

Among the languages of the world, both ablaut and reduplication are widely attested. One therefore finds a large fraction of morphology that potentially is polyfunctional. Of course, certain ablaut melodies as well as certain types of reduplication can be further grammaticalized, so that they become monofunctional. It is also possible that some of these elements are redefined and then become true affixes, with both syllable structure and melody. One can imagine that affixes which emerged in that way could be polyfunctional as well, and determined only in the context of application.

2. Some extreme examples of polyfunctionality

Watters (2005) reports about Kusunda, a language isolate of Nepal, that a particular harmonic mutation on verbs marks the semantically more articulated category in a pair of categories, regardless of the particular dimension; so it marks causative in the transitivity dimension, irrealis in the modality dimension, negation in the polarity dimension, and dependent in the dependency dimension (3a-d). Thus, a single phonological feature (mutation) is paired with semantic markedness, whereas the concrete semantic operation has to be chosen from a set of alternatives.

(3) Polyfunctionality of a phonological operation: mutation in Kusunda (vowels shift to low, consonants shift to back): (Watters 2006)

    a. dzuŋ-dzi.   dzoNˤ-a-dzi.   Transitivity (Causative)
       hang-3   hang-CAUS-3
       'It hangs.'   'He hung it.'

    b. n-əg-ən.   ɲ-aGˤ-an.   Modality (Irrealis)
       2-go-REAL   2-go-IRREAL
       'You went.'   'You will go.'

    c. unda-go.   unda-n-aGˤo.   Polarity (Negation)
       show-IMP   show-ʔ-NEG
       'Show it!'   'He didn't show it.'

    d. n-əg-ən.   nən-da ɲ-aGˤ-an   e-g-i.   Dependency (Subordinated)
       2-go-INDEP   you-ACC 2-go-SUBORD give-3-PAST
       'You went.'   'He let you go.'

The most frequent suffix in Kusunda is *-da*. It marks non-subject case (distinguished as locative, accusative and dative by Watters), as well as some functions of dependent verbs (such as the purposive). These together can be generalized as 'dependency marking' (4a-d). There are three further functions of *-da* (incompletive, causative, and plural in (4e-g)), which are semantically distinct from the preceding ones, as well as from each other. It is not clear in what respect the causative *-da* and the plural *-da* have different distributions so that the ambiguity of the suffix could be resolved within the clause; possibly we have it to do with lexicalizations.

(4)   Polyfunctionality of affixes: Suffix *-da* in Kusunda (Watters 2006)

   a. un-**da**   myaq   pərmə-d-i   qhai-ts-n.   Locative
      road-LOC leopard   meet-1-PAST   afraid-1-REAL
      'I met a leopard on the road and was frightened.'

   b. pyana   tsi nən-**da**   imba-d-i.   Accusative
      yesterday I   you-ACC think-1-PAST
      'Yesterday I thought about you.'

   c. tən-**da** idaŋ kha:ˢu.   Dative
      I-DAT hunger is.not
      'I am not hungry.'

   d. t-əm-**da**   t-ug-un.   Purposive
      1-eat-PURP   1-come-REAL
      'I came to eat.'

   e. tsi ts-əg-ən-**da**.   Incompletive
      I   1-go-REAL-INCOMP
      'I was going.'/ 'I used to go.'

   f. ts-ip-n̩.   vs.   ip-**da**-d-i.   Causative
      1-sleep-REAL   sleep-CAUS-1-PAST
      'I slept.'   'I put him to sleep.'

   g. t-əm-ən.   vs.   t-əm-**da**-n.   Plural
      1-eat-REAL   1-eat-PL-REAL
      'I ate.'   'We ate.'

Another extreme example of polyfunctionality is attested in Chukchi, where the suffix *-tku/-tko* not only functions as a general detransitivizer comprising anticausative, antipassive, reflexive and reciprocal (see (11) below), but also derives a group reading in combination with a noun (5a) and an iterative reading in combination with a verb (5b-d), which reminds us at what reduplication can do. Interestingly, the affix itself can be iterated as in (5d). Moreover, this affix also derives verbs from instrumental nouns (5e), and functions as 1pl object marker in the presence of a 2nd person subject (5f). Some of the latter functions should be regarded as accidental homonymy. The question is why this can happen.

(5)   Polyfunctional *tku-/tko-* in Chukchi with some typical reduplicative readings
      (Nedjalkov 2006: 223-225)
   a. əkwə-t 'stones'   – əkwə-**tko**-t 'a group of stones'
   b. juu-nin 'he bit him (once) – juu-**tku**-nin 'he bit him (several times)'
   c. nə-lʔu-wəlɣ-ə-tku-qinet   d. təm-ə-**tko**-wəlɣ-ə-**tko**-ɣʔat
      IMPF-see-RECIP-ə-**tku**-3pl   kill-ə-tko-RECIP-ə-tko-AOR.3pl
      'they (often) saw each other'   'they (many) killed each other (repeatedly)'
   e. milyer 'rifle' – milyerə-**tku** 'to shoot'
   f. pela-**tko**-tək
      leave-1plO-2plS
      'you left us'

3. Transitivity alternations

In the following, I briefly consider polyfunctionality in the realm of transitivity alternations. One can find here certain systematic patterns, which make the concept of an affix as a lexical item with a fixed functional meaning questionable.

In the Pama-Nyungan languages of Australia one often finds a single affix functioning as a general transitivization marker. The Kalkatunga suffix *-nti*, e.g., adds a causer if it is combined with an inchoative or stative verb (6a), but it adds a beneficiary, instrument, or location if it is combined with an agentive verb (6b). In a subgroup of these languages the same affix can be applied on transitive verbs as well, but usually only when they have first been detransitivized by antipassive, as in (6c). (Antipassive demotes the object, which is visible here in the oblique dative marking.)

(6) Transitivization in Kalkatunga (Austin 1997)
    a. iti 'return'   iti-nti 'send/bring back'   Causative
        nguyi 'fall'   nguyi-nti 'push over'
    b. nuu 'lie'   nu-nti 'lie on (something)'   Applicative
        wani 'play'   wani-nti 'play with (something)'
    c. Nga-thu kati-nti-mi   tharntu   kupangurru-u.
        1-ERG   bury-TR-FUT   hole   old.man-DAT
        'I will bury the old man in a hole.'

A canonical transitive verb can eventually be decomposed into an *active* (controller) and an *affected* predicate. Given that an intransitive verb instantiates either active or affected, the function of the transitivizing affix then is to derive a canonical verb, i.e. to add the respective complementary predicate.

(7) Output-related affixes: An unspecified transitivizer derives a canonical transitive verb
    TR $[\lambda y \ \text{AFF}(y)] \ = \ \lambda y \ \lambda x \ \{\text{ACT}(x) \ \& \ \text{AFF}(y)\}$
    TR $[\lambda x \ \text{ACT}(x)] \ = \ \lambda y \ \lambda x \ \{\text{ACT}(x) \ \& \ \text{AFF}(y)\}$

Different from *-nti* above is an affix that either transitivizes or detransivizes, as, e.g., *-e* in Japanese. Comrie (2006) lists 57 inchoative/causative pairs in which *-e* derives the causative verb (8a), and 36 pairs in which it functions to the opposite, namely derives the inchoative verb from the transitive one (8b). Much larger is the number of pairs where both verbs are derived by different means (8c).

(8) Causatives vs. anticausatives in Japanese (Comrie 2006)
    a. ak-u 'open'   ak-e-ru 'open (tr.)'   Causative (transitivization)
        itam-u 'hurt'   tam-e-ru 'injure'
        tat-u 'stand'   tat-e-ru 'raise'
    b. nuk-u 'remove'   nuk-e-ru 'come off'   Anticausative (detransitivization)
        or-u 'break (tr.)   or-e-ru 'break'
        tuka-u 'use'   tuka-e-ru (be usable)
    c. kowa-s-u 'destroy' kowa-re-ru 'be destroyed'.

A similar phenomenon has been observed in other languages, too (Haspelmath 1993). In their majority, languages tend to use the causative operation more frequently than its opposite, called anticausative. Only the semitic languages show more anticausatives, using, however, a number of different prefixes. Formally, one can describe the function of Japanese *-e* as in (9). It is important to note that, unlike passive, the anticausative does not imply the presence of an agent.

(9) Two-state switchers: The affix marks the opposite state of a transitive-intransitive pair
   **-e** [λy AFF(y)]   =   λy λx {ACT(x) & AFF(y)}
   -e [λy λx {ACT(x) & AFF(y)}]   =   λy AFF(y)

Obviously, the anticausative operation conflicts with the principle of monotonicity, stating that no semantic information is deleted in the course of derivation. Therefore it is hard to conceive of an affix to have emerged with a pure anticausative function; it would have been blocked by the above principle. What one indeed finds are morphemes with a broader function including as a special case the anticausative reading.

   One possibility is, within the inchoative/causative pairs, that a marker can choose either the more complex or the more simple item. Given a grammatical dimension in which pairs of lexical items derived from a common stem can be ordered, one member of the pair should have the semantic property X, while the other lacks it. Usually one expects pairs <σ,σ'> such that σ=<PF,SF> and σ'=<PF+pf, SF+sf>, where <pf,sf> is the contribution of an affix or some other morphophonological operation. However, if a form expressing SF+sf is more likely to be used than the alternative form expressing SF simpliciter it is conceivable that the more complex meaning is combined with the more simple PF, so that pairs <σ,σ'> such that σ=<PF,SF+sf> and σ'=<PF+pf, SF> might become possible as well. (Bidirectional optimality theory would be able to model such a situation, see Blutner and Zeevat 2004).

   The other possibility is detransitivization as a multi-functional operation, which derives, depending on the specific meaning of the verb, several kinds of intransitive readings. The middle voice is typically known for its multiple readings. Unlike passive and antipassive as special operations for deactivating the higher or the lower argument (the agent or patient) respectively, the middle seems to be a general operation that basically contrasts intransitives (of any kind) to transitives. According to the diagram (10) one can distinguish general transitivizers and general detransitivizers from more specific operations. In (8), the more specific pair causative/anticausative was illustrated; it would be interesting to know whether other specific pairs such as antipassive/applicative exist as well, and if not, why not.

(10) Transitivity alternations: Multifunctional transitivizers vs. detransitivizers
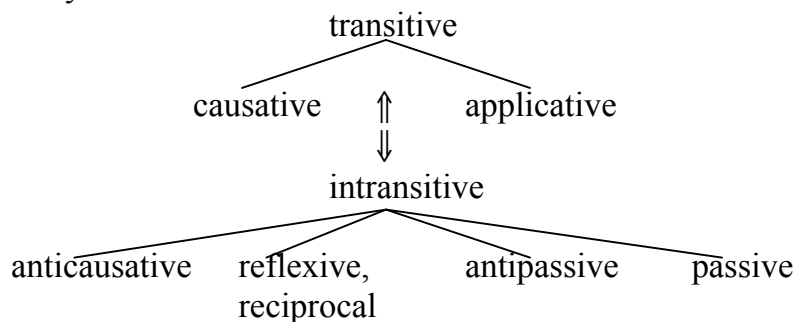
Much more often than the fusion of causative and applicative in a single affix (see (6)) one finds a fusion of detransitivizing operations in a single affix.

(11) Detransitivization in Chukchi (Nedjalkov 2006: 222)
   a. ejpə-nin 'he closed it'   ejpə-***tku***-γˀi 'it closed'   (*anticausative*)
   b. ˀəttˀ-e juu-nin 'the dog bit him'   ˀəttˀ-ən nə-jγu-***tku***-qin 'the dog bites' (*antipassive*)
   c. tewla-nen 'he shook it off'   tewla-***tko***-γˀe 'he shook himself'   (*reflexive*)
   d. ommačajpə-nen 'he hugged him'   ommačajpə-***tko***-γˀat 'they hugged each other'
                                      (*reciprocal*)

Thus, besides of all its other functions, *-tku/-tko* provides a whole set of detransitivizing operations.

(12) Polyfunctional detransitivizer in Chukchi (output-related affix)
-tku/-tko [λy λx (ACT(x) & AFF(y))]   =
{λy AFF(y), λx ∃y (ACT(x) & AFF(y)), λx (ACT(x) & AFF(x)), …} = *λz P(z) (variable)*

In Kharia, a South Munda language, every predicate must be voice-marked for either middle or active (where voice is always fused with tense-mood). Numerous verbs are middle-only, numerous are active-only, and many more verbs allow both options. The verb gets inchoative reading in the middle, but causative reading in the active (13a). Furthermore, verbs that are independently marked for passive/reflexive require the middle (13b), and those that are marked for causative require the active (13c).

(13) Middle/active pairs in Kharia (Peterson 2006)
   a. ayo   'become a mother'   'accept s.o. as a mother'
      khatam   'come to an end'   'finish' (TR)
      sebol   'become sweet'   'make sweet'
      tuta   'go down'   'put down'
   b. yo dom-ki-kiyar.
      see PASS/REFL-MIDDLE.PAST-DUAL
      'They two were seen (by someone else). / They two saw themselves.'
   c. yohan   beta   o-dam-e.
      John   boy   CAUS-arrive-ACT.IRR
      'John will bring the boy.'

If there is lexical ambiguity, the voice operation selects one of the lexical options, which, however, can be overridden. Besides various intransitive readings, the middle in Kharia characterizes habitual, persistent, self-directed, unsuccessfully attempted, spontaneous, or unexpected actions, as well as those in which the subject participates only indirectly. As Peterson (2006) argues, the middle appears to mark those events which differ somewhat from prototypical actions, in contrast to the active, which marks events that are closer to prototypical actions. Thus, the middle is a grammatical category that appears to be poly-semous.

   Similarly, the middle voice of Greek, and the reflexive in Spanish, Russian, and other Indo-European languages of Europe are notoriously known for their multifunctionality, including the anticausative reading.

(14) Polyfunctional reflexive *se* in Spanish (Kaufmann 2004: 191)
   a. Juan se lava.   'Juan washes himself.'   (*reflexive*)
   b. La cuerda se rompe.   'The rope splits.'   (*anticausative*)
   c. El libro se publicó en 1952. 'The book was published in 1952.' (*passive*)
   d. Se vive bien aqui.   'People live well here.'   (*impersonal*)
   d. Estas frutas se comen.   'These fruits are eatable.'   (*modal*)

Kaufmann (2004) tried to find a general meaning of the middle affixes of Classical Greek, as well as those of Fula, from which the specific subreadings could follow as special contextual instances. Regardless of whether such a reconstruction succeeds for a number of readings, one must be sceptical whether such an enterprise is on the right track in general. Affixes (or clitics, as in Spanish) often seem to be a constructional device for generating

alternative forms with a slightly different (or more complex) meaning rather than having a unique specific meaning by themselves.

4. Pronominal affixes

Various languages only have one set of pronominal affixes to be attached on the verb, not specified for their function as subject or object. One possibility to break up this ambiguity is affix position, which, however, also interacts with person, and thus is not successful in general. Another possibility is direct vs. inverse marking, which maps person hierarchy onto argument hierarchy. The relevant person hierarchy for Ojibwe (Algonquian) is 2 > 1 > 3(prox.) > 3obv. Inverse marking is used if the lower argument outranks the higher argument in person. The examples in (15) are pairwise identical except that different voice suffixes directly follow the stem. Note that Algonquian requires subject and object to have always different values on the person hierarchy; only one 3rd person argument can be proximate, all others must be obviative.

(15) Breaking up subject-object ambiguity: Direct vs. inverse marking in Ojibwe (Valentine 2001)
    a. n-waabm-**aa**-min.   n-waabm-**igo**-min.
        1-see-DIR-1pl   1-see-INV-1pl
        'We (excl) see him/them'   'They see us (excl).'
    b. g-waabm-**aa**-min.   g-waabm-**igo**-min.
        2- see-DIR-1pl   2 see-INV-1pl
        'We (incl) see him/them'   'They see us (incl).'
    c. w-waabm-**aa**-n.   w-waabm-**igo**-on.
        3-see-DIR-3   3-see-INV-3
        'She sees him/them$_{obv}$.'   'He/they$_{obv}$ see her.'
    d. g-waabm-**i**-min.   g-waabm-**ini**-min.
        2-see-**i**-1pl   2-see-INV-1pl
        'You (sg/pl) see us (excl).'   'We (excl) see you (sg/pl).'

Another possibility, of course, is that at least some of the pronominal affixes are specified for case. Let us briefly consider Turkana (Nilo-Saharan), which has just one accusative morpheme, namely the prefix k-, indicating local person (1st or 2nd). (This is in harmony with the universal tendency that accusative marking is more likely with a higher person than with a lower person.) Together with a case-neutral prefix a- (1. person) or i- (2. person) an interesting ambiguity arises. If this person affix functions as subject, the respective other local person must be the object – because a reflexive reading is excluded (readings (i) in (16)); however, if it functions as object, it specifies the preceding k-, and the subject must be 3rd person – because a 1st or 2nd person subject has to be marked (readings (ii)). Such a situation can again be modeled in bidirectional OT.

(16) Subject-object ambiguity of affixes: The interaction of accusative with case-neutral prefixes in Turkana (Dimmendaal 1983)
    a. k-à-min-à.
        loc.ACC-1-love-ASP
        (i) 'I love you.', (ii) 'She loves me.'
    b. k-ì-min-à.
        loc.ACC-2-love-ASP
        (i) 'You loves me.', (ii) 'She loves you.'

5. Conclusion

The line of argumentation runs as follows: (i) Various languages show affixes with a large amount of polyfunctionality. Sometimes one can observe certain patterns, for instance that affixation produces a fixed result (like a canonical transitive verb), or that it functions as a switcher between two possible states. It also often adds a semantic complexity in the most obvious dimension of a set of possible dimensions. (ii) As far as affixation emerges from redefinition of phonological alternations, it is expected that there are rather few affixes with many functions. The same holds if affixation emerges from reduplication. (iii) Provided that contextual semantic adaptation is less costly than the storage and processing of lexical items with an explicit meaning, polyfunctionality could be an economic means of languages. What I would like to offer here is the idea that something along these lines could be true, although more intensive studies are necessary. In any case, polyfunctionality challenges the traditional concept of affix.

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