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INFLECTION AND INFORMATION

Abstract
An information-based approach to morphology provides a simple and clean method of distinguishing among morphological operations, by focusing on their informational effects. One value of making distinctions on these grounds is the internal order it brings to morphological processes; another is the possibility it allows for generalizations across the domains of morphology and syntax.

1. Introduction

Two debates inform current morphological theory. One has to do with the status of morphemes. Morpheme-based theories focus on identifying discrete phonological sequences and accounting for the effect of their presence. Pointing to the many morphological phenomena that do not involve the addition of a discrete phonological piece, non-morphemic morphological theories focus rather on accounting for the kinds of relationships that can exist between and among stems and words. A second debate has to do with whether the principles governing morphology are fundamentally distinct from the principles governing syntax. The two issues are logically independent in fact, but in practice they are not. In general, morpheme-based theories also take the position that the principles governing the structure of words and those governing the structure of sentences are essentially identical, while non-morphemic theories argue that the principles governing the two domains are fundamentally distinct.

After establishing the assumptions under which the investigation will proceed, the body of this paper expands on the information-based theory of inflection offered in Steele 1995 and termed 'Articulated Morphology'. Like all information-based theories, Articulated Morphology focuses on the informational relationships among linguistic objects – i.e., on the differences in information between one linguistic object and another. As a processual theory, Articulated Morphology is also fundamentally concerned with the processes that yield these differences. The heart of this paper is an information-based distinction among three kinds of operations – those that add information to the operand (the object they operate on); those that change its information; and those that eliminate information from the operand. Given the primacy of these kinds of informational effects, it is possible to conceptualize more clearly the character of inflection, derivation, and compounding. Further, the classification of morphological operation types corresponds simply and intuitively to a classification of syntactic operation types.

Information-based theories of syntax have achieved wide currency. In contrast, the study of morphology from an informational perspective is in its infancy. This paper redresses this asymmetry and, in the process, offers a new perspective on similarities with the principles of syntax. Although the interest in morphemeless morphological theories has contributed to the development of an information-based view of morphology, being information-based does not in and of itself determine a position on the existence of morphemes. That is, it is logically possible that an informational difference between two linguistic objects would always be associ-

ated with the presence of discrete phonological sequences. The logical possibility, however, is not an article of faith; rather, it is an empirical question. Articulated Morphology does not require the existence of morphemes and easily accommodates the phenomena driving the development of non-morphemic theories. In regard to the issue of the principles of syntax and morphology, then, the information-based approach argued for here affords generalizations across the two domains, a conclusion more commonly associated with morpheme-based theories.

2. Background

I begin with three assumptions. First, drawing on information-based syntactic theories (like HPSG or LFG) and consistent with the morphological work of Aronoff 1994, I take linguistic objects, whether they involve stems, words, phrases or sentences, to be signs involving a phonological part, a semantic part and, crucially for this paper, a syntactic part.

1. [phonology]
   [syntax]
   [semantics]

Second, I assume that the syntax of a sign is an articulated attribute/value structure. That is, each of the three parts of the sign in 1 involves a set of features and associated values. Because I will take no position for the purposes of this paper on the internal structure of the phonological and semantic parts, 2 expands accordingly the syntax of a sign only. Each of the superscripted *F*s stands for an attribute; the lower case letters represent values.

2. [phonology]
   $\begin{bmatrix} F^1: a \\ F^2: b \\ F^3: c \end{bmatrix}$
   [semantics]

Third, morphological and syntactic operations take signs and manipulate their properties. Three logical possibilities present themselves: An operation may (a) modify, (b) add to, or (c) subtract from the information represented in the attribute/value structure of the operand. Although, as we will see, these three logical possibilities are not entirely mutually exclusive, 3 presents a schematic representation of each as an independent option.

3. Informationally Additive Operation:
   [Property X] → [Property X & Property Z]
   Informationally Modificational Operation:
   [Property X] → [Property Y]
   Informationally Subtractive Operation:
   [Property X & Property Z] → [Property X]

An example from Potawatomi (an Algonquian language) illustrates the first type and also gives a general sense of the approach to be adopted.[1] Intransitive verb stems in Potawatomi may include information about the animacy and person of their subjects. The intransitive stem *nis:e*

[1] The analysis on which this example is based is found in Steele 1995. The Potawatomi data are drawn from the published work of Hockett. The Luiseño data used later in this paper are from my work with the late Villiana Hyde and are written in the orthography introduced in Hyde 1971.

'fall down' requires an animate third person subject. (Consistent with the focus on the syntax of a sign, the phonological and semantic properties are maximally simplified. The phonology is the orthographic representation. The semantic properties appear as a simplified predicate calculus.)

4. Phon: *nis:e*
   Syntax [ANIMATE: +, PERSON: 3]
   Seman: FALL DOWN(x)

A word includes not only information about the animacy and person of the subject, but also information about its number. So, the word *nis:e-k* 'they fall down' requires an animate third person **plural** subject.

5. Phon: *nis:e-k*
   Syntax [ANIMATE: +, PERSON: 3, NUMBER: pl]
   Seman: FALL DOWN(x)

The attribute/value pair having to do with number differentiates a word (which has it) from a stem (which doesn't). The mapping between 4 and 5 is a morphological operation that takes an animate third person stem and yields an animate third person plural word, by both changing the phonology and adding 'NUMBER: pl'. (The operation in 6 adds both the attribute NUMBER and its value, in order to emphasize the fact that the domain lacks number and the codomain includes number. It could equally be the case that the domain includes the attribute and the operation adds only its value.)

6. pl:
   Phon: Z
   Syntax [ANIMATE: +, PERSON: 3]
   Seman: V(x)
   → Phon: Z*k*
   Syntax [ANIMATE: +, PERSON: 3, NUMBER: pl]
   Seman: V(x)

The two other types of operations in 3 will be exemplified below. But, given this example, we can consider and exemplify the two fundamental principles of Articulated Morphology:

7. **Principle 1**: Morphological objects can be differentiated according to the kind of information they present.
   Principle 2: Morphological operations can be differentiated according to the kind of object they are performed on and the kind of information they manipulate.

We will also assume the following special case of Principle 1, as establishing initial parameters.

8. **Assumption A**: Stems are informationally reduced, relative to words.

Ex 4 is a Potawatomi stem; 5 is a Potawatomi word. The fact that there is a difference is consistent with Principle 1 and the particular contrast is consistent with Assumption A. Moreover, the distinction between Potawatomi (verb) stems and the words that contain them is consistent with both Principle 1 and Assumption A. As in 4, the syntactic information associated with a Potawatomi (verb) stem indicates how many arguments the verb requires (here one) and the animacy of at least one (the only argument in the intransitive case and the second argument in a transitive case); the syntactic information may also include the person of one of the arguments (here third person). The syntactic information associated with a Potawatomi word includes all the in-

formation associated with the stem and more, as Assumption A requires. In particular, each argument is associated with both person and number. Schematically:

9. Stem: # of arguments = X
   # of instances of person ≤ X
   # of instances of number = 0
   Word: # of arguments = X
   # of instances of person = X
   # of instances of number = X

Principle 2 refers to the character of operations. The operation in 6 that adds number information takes a stem and yields a word. However, it is not the case that all morphologically simple stems include a particular person value. Morphologically simple transitive animate stems, for example, are subject to operations that determine the person of their arguments. The animate transitive stem *wapm* 'x see anim', for example, can occur in the following complex forms: *wapma* 'x see 2anim', *wapmUkO* '3 see anim', *wapmn* 'x see 2anim', and *wapmy* '2 see anim'. The operations in 10, each of which has a distinct informational effect on the attribute PERSON, yield this array.

10. a. Phon: *Z* Syntax: [P:] [ANIM: + P:] → Phon: *Za* Syntax: [P:] [ANIM: + P: 3]

b. Phon: *Z* Syntax: [P:] [ANIM: + P:] → Phon: *ZukO* Syntax: [P: 3] [ANIM: + P:]

c. Phon: *Z* Syntax: [P:] [ANIM: + P:] → Phon: *Zn* Syntax: [P:] [ANIM: + P: 2]

d. Phon: *Z* Syntax: [P:] [ANIM: + P:] → Phon: *Zy* Syntax: [P: 2] [ANIM: + P:]

The contrast between the operation in 6 and the operations in 10 illustrates the distinction between operation types allowed by Principle 2. The Potawatomi operations that add number take stems and yield words. The operations in 10 that add person take stems and yield stems. These operations illustrate one more point that is essential to our discussion. The schematic statements about addition, subtraction and modification in 3 do not differentiate between attributes and values. Our focus here is on values. Addition always involves the addition of a value; modification always changes a value; and subtraction always removes a value. It is logically possible, as noted above, that some operations might involve both an attribute and a value and others only a value. Because we will presume that stems and words include the same attribute sets, only the latter is an option.

11. a. Addition: [F:] → [F: x]
b. Modification: [F: x] → [F: y]
c. Subtraction: [F: x] → [F:]

Refining the differences among these three operational types is possible through an analysis of Luiseño, a Southern California Uto-Aztecan language of Northern San Diego County.

3. Addition and Modification.

The Potawatomi case illustrates that addition involves adding a type of information previously absent. The Luiseño case contrasts this straightforward example of addition with an equally straightforward example of modification – replacing an instance of a particular kind of information by the same kind of information.

The syntax of Luiseño stems involves the four features in 12.

12. Syntax: CAT(EGORY):
N(UMBER):
ASP(ECT):
SUBCAT(EGORIZATION):

Every stem has a value for the features CAT and SUBCAT; a stem may, but need not, have in addition a value for the features ASP and N. The values available to the last three are reasonably familiar; only the first requires any introductory comments. Although we could employ any of a variety of terms to distinguish among category types, I continue from previous discussions (e.g. Steele 1988) the mnemonic labels in 13, where +/-poss indicates the possibility (or the impossibility, respectively) that a stem may combine with a possessive and +/-abs indicates the possibility (or the impossibility, respectively) that a stem may combine with an absolutive. (**Absolutive** is the term used in Uto-Aztecan for a set of morphs – *-t, -ta, -sh, -cha,, -la, -l* – that appear on the citation (or absolute) form.)

13.

[CAT: -poss, +abs]	[CAT: +poss, +abs]
hunwu 'bear'	too 'rock'
qeengi 'squirrel'	huu 'arrow'
tuupa 'sky'	kutapi 'bow'
[CAT: -poss, -abs]	[CAT: +poss, -abs]
heela 'sing'	peew 'spouse'
'aamo 'hunt'	yo' 'mother'
pelee'i 'lick'	kaamay 'son'

The informational effect accompanying the addition of the morph *-ki* changes the categorial assignment of a stem. As illustrated in 14, stems including this morph are based on members of the first category, but they behave morphologically like members of the fourth.

14. a. hunwut 'bear' nohunwuki 'my (toy) bear'
*nohunwu *hunwuki-sh
b. tuupash 'sky' notuupaki 'my (piece of) sky'
*notuupa *tuupaki-sh

These data can be captured with a morphological operation that modifies the categorial information of a stem – replacing the value '-poss, +abs' **with another value of the same type** '+poss, -abs'.

15. [+poss, -abs]:

Phon: *X* → Phon: *Xki*

Syntax [CAT: -poss, +abs] → Syntax [CAT: +poss, -abs]

Another example is useful to underline the character of modification as replacing one value with another of the same type. In addition to the attribute CAT(egory), the syntax of Luiseño stems includes information about their subcategorization possibilities. (See Steele 1990 for an extensive discussion.) For example, *pelee'i* 'lick' requires two arguments, a subject, which need not have lexical instantiation, and an object-marked object; *heela* 'sing', in contrast, requires only a subject, which similarly need not be lexically instantiated. Ex. 16 provides some simple examples and 17 illustrates how the subcategorization properties are to be represented. The lower case 'obj-mrk' identifies the formal property of the obligatorily present argument – it must be marked for object; the capital 'SUBJ' indicates the necessity of a subject but does not carry requirement as to its formal character.

16. a. pommay pum **pelee'iwun** 'They are licking their hands.'
their.hands.obj aux are.licking

b. **heelaq** up 'S/he is singing.'
is.singing aux

17. a. Phon: pelee'i
Syntax: [CAT: -poss, -abs; SUBCAT: [obj-mrk; SUBJ]]
Seman: LICK(x y)

b. Phon: *heela*
Syntax: [CAT: -poss, -abs; SUBCAT: [SUBJ]]
Seman: SING(x)

Luiseño has a morphological causative, the effect of which is to change the subcategorization properties of a stem, as the contrast between 16a and 18 will make clear.

18. pommay pum pomoomi **pelee'iniwun**
their.hands aux them.obj is.making.lick
'They are making them lick their hands.'

The syntactic information of the stem *pelee'ini* is, thus, distinct from the syntactic information associated with the stem *pelee'i.*

19. Phon: pelee'ini
Syntax: [CAT: -poss, -abs; SUBCAT: [obj-mrk; obj-mrk; SUBJ]]
Seman: LICK(x y z)

The difference between 17a and 19 might appear to be characterizable as addition – 19 has, after all, an 'additional' argument in SUBCAT. However, the value of an attribute is not internally decomposable. Just as the operation in 15 replaces a complex value with another complex value, the causative operation replaces one non-decomposable argument structure type with another.

20. causative:

Phon: X	→	Phon: X*ni*		
Syntax:	CAT:	-poss -abs	Syntax:	CAT: -poss -abs
	ASP:			ASP:
	SUBCAT:	[obj-mrk; SUBJ]		SUBCAT: [obj-mrk; obj-mrk; SUBJ]
Seman: S(x y)			Seman: S(x y z)	

Although the argument types – e.g. 'obj-mrk' or 'SUBJ' – comprise a small set, their combinations are also drawn from a small set, one that does not exhaust the logically possible combinations of argument types. (Argument types include, in addition to 'obj-mrk' and 'SUBJ', those marked for number and those with postpositions, among other possibilities.) For example, no argument structure is composed of more than four arguments and only those that have the formal property 'obj-mrk' can occur more than once. Were the attributes for the feature SUBCAT decomposable, operations that create non-existent combinations of arguments would require adhoc proscription. Nothing would preclude three, four or more causatives, because each would simply add 'obj-mark'. Thus, the value for the attribute SUBCAT (or any other attribute) can be internally complex, but change in their values must be viewed as replacing in the syntax of the stem one non-decomposable value with another.

4. Inflection and Derivation.

Against this background, 21 represents the conceptual difference between the addition of information and the modification of information.

21. a. Addition [F :] → [F : x]

b. Modification [F : y^i] → [F : y^j] (where y^i and y^j are values of the same type)

In Steele 1995 I proposed that inflection be defined as operations involving the addition of information. If this is reasonable and if our morphological primitives are inflection, derivation and compounding, it is also reasonable to define derivation as operations that modify information. The schema in 21a would, thus, represent inflection and that in 21b, derivation. However, not all operations are purely one or the other. The question, then, is how to treat such hybrid operations.

Essentially all Luiseño stems which are [CAT: -poss, -abs] may undergo any of a rich set of aspectual operations. Ex. 22 introduces the result of three such operations on the stem *'aamo* 'hunt', bolding the phonological effect.

22. 'aamo**lo** 'hunt (generically)'
'aamo**qala** 'hunt (changing over time)'
'aamo**mokwi** 'hunt (past)'

Not only do the aspectual operations add to the syntax of a stem aspectual information like that represented somewhat clumsily by the glosses in 22, they also replace the category of the stem with a different category of the same type. That is, they combine an informationally additive effect with an informationally modificational effect.

The stem *'aamo* 'hunt' has the attribute/value structure in 23.

23. Phon: *'aamo*

Syntax:	CAT:	-poss -abs
	N:	
	ASP:	
	SUBCAT:	[obj-mrk; SUBJ]

As the value for CAT indicates, *'aamo* is subject to operations introducing neither the absolutive nor the possessive. Rather, stems of this type may undergo any one of a set of tense operations.

24. 'aamo**q** 'is hunting'
'aamo**n** 'will hunt'
'aamo**qu** 'was hunting'

The forms in 22, in contrast, are not subject to tense operations, but they do exhibit different possibilities relative to the absolutive and the possessive.

25. possessive only [CAT: +poss, -abs]
po'aamolo 'for 3sg to hunt'
possessive and absolutive [CAT: +poss, +abs]
po'aamoqala '3sg hunting'
'aamoqal ('aamoqala-l) 'hunting'
absolutive only [CAT: -poss, +abs]
'aamomokwi**sh** 'hunted'

These facts can be accommodated by a set of aspect operations. Each takes a stem where the value for ASP is not specified and adds a value for this attribute; each, in addition, takes a stem specified [CAT: -poss, -abs] and replaces the value for this attribute with another of the same type. The three operations in 26 exemplify, therefore, an operation type that simultaneously adds and modifies information

26. a. generic:

Phon: *X*				Phon: *Xlo*		
Syntax	CAT:	-poss -abs	→	CAT:	+poss -abs	
	ASP:			ASP:	generic	

b. changing:

Phon: *X*				Phon: *Xqala*		
Syntax	CAT:	-poss -abs	→	CAT:	+poss +abs	
	ASP:			ASP:	changing	

c. unchanging past:

Phon: *X*				Phon: *Xmokwi*		
Syntax	CAT:	-poss -abs	→	CAT:	-poss +abs	
	ASP:			ASP:	unchanging past	

The aspectual operations provide information about aspect not found in the stems to which they apply, but they also change the category of the stem – i.e. in regard to aspect they are informationally additive, but in regard to category they are information changing. If inflection and derivation exhaust our choices, the options are clear:

27. a. informationally additive = inflection
informationally modificational only = derivation
b. informationally additive only = inflection
informationally modificational = derivation

In fact, the option in 27b has been proposed in Lieber 1992. If her account of such complex operations is correct, we would identify aspect as derivation and expect it to pattern with examples of simpler derivation types like *-ki* in 15.

Lieber assigns all morphemes but inflectional affixes a 'categorial signature', a bundle of attributes which, for each morpheme, may but need not be accompanied by values. Inflectional affixes are accompanied by a reduced set of attributes, and each attribute present must be specified with a value. The categorial signature of a word is constructed from the information contributed by the morphemes it contains, according to a system of 'percolation'. First, given a binary branching tree, one branch leads to a 'head' and the other to a non-head. Second, the information from whichever morpheme is the head is percolated to the dominating node; if the head lacks information found in the nonhead, this additional information is carried up as well. Consistent with Lieber's idea that an inflectional affix cannot be a head, its partial informational structure can only be added to the categorial signature of the dominating node. 'In derivational word formation the value for a feature of a head morpheme will supercede or override that of an inner morpheme. Features from inflectional morphemes can never override features from their bases, but can only fill in values unspecified in the categorial signatures of their bases. Inflectional word formation is therefore **additive** in a way that derivational word formation...[is] not.' (p.112) Ex 28 reformulates the operation in 15 in conformity with Lieber's proposals.

28.

a. *tuupa* 'sky'

CAT:	-poss
	+abs
ASP:	
SUBCAT:	null

b. *-ki*

CAT:	+poss
	-abs
ASP:	
SUBCAT:	null

c.

CAT:	-poss
	+abs
ASP:	
SUBCAT:	null

Head Percolation

CAT:	+poss
	-abs
ASP:	
SUBCAT:	null

tuupa 'sky'

CAT:	-poss
	+abs
ASP:	
SUBCAT:	null

ki

Aside from the general difficulties associated with positing morphemes (richly detailed by Anderson 1992, among others), this analysis is reasonably consistent with the comparable analysis of *-ki* above.

The flaws in Lieber's notion of inflection are obvious, however, when we consider an example, like Luiseño aspect, which simultaneously adds and modifies information. Because Luiseño as-

pect overwrites the value for CAT, on Lieber's account it must be of the same morphological type as Luiseño *-ki* – that is, derivational. The morpheme *-mokwi*, for example, would have the categorial signature in 29.

29. *-mokwi*

CAT:	-poss
	+abs
ASP:	unchanging past
SUBCAT:	

As the head of the structure in 30, presumably, it would override the stem's value for CAT by 'head percolation', supplying as well a value for ASP. Because *mokwi* lacks a value for SUBCAT, the subcategorization value for *'aamo* would fill in by 'backup percolation'.

30.

CAT:	-poss
	+abs
ASP:	unchanging past
SUBCAT:	[obj-mrk; SUBJ]

Backup Percolation

CAT:	-poss
	+abs
ASP:	unchanging past
SUBCAT:	

Head Percolation

CAT:	-poss
	-abs
ASP:	
SUBCAT:	[obj-mrk; SUBJ]

'aamo 'hunt'

CAT:	-poss
	+abs
ASP:	unchanging past
SUBCAT:	

mokwi

In terms of the behavior of the resulting stems, the model in 27b as interpreted in 29 and 30 seems an incorrect result. First, no aspectual element replaces the subcategorization properties of the stem with which it combines, a fact that is without explanation on Lieber's analysis. It is simply an accident in this analysis that heads that are aspectual elements lack a value for SUBCAT. Second, any operation that is purely informationally modificational, like the causative, precedes the aspectual operations, and no operation with any modificational effect is possible after the aspectual operations. On Lieber's analysis, the causative and other modificational operations could just as well follow the aspectual operations, since all are derivational.

Of the two models in 27 that in 27a seems the best characterization of the mapping from informational effects to the distinction between inflection and derivation. That is, we can identify operations that are informationally modificational only with derivation and we can identify with inflection operations that involve informational additivity, whatever other informational effects they might have. This model can be presented somewhat more formally as follows:

31. Derivation: $[F: y^i] \rightarrow [F\ y^j]$

Inflection: $\begin{bmatrix} (F^1: y^i) \\ F^2: \end{bmatrix} \rightarrow \begin{bmatrix} (F^1: y^j) \\ F^2: x \end{bmatrix}$

On this model, inflection has a broader domain than does derivation within the informational parameters at issue. It follows, as well, that the morphological types involved will also have a wider range. The examples offered above demonstrate this latter point. The Luiseño examples of derivation and inflection both involve mapping from stem to stem, but the Potawatomi examples of inflection include an operation mapping from a stem to a stem (as in 10) and an operation mapping from a stem to a word (as in 6).

5. Compounding

To complete the picture we must consider, if briefly, the informational domain of compounding. Given the options offered at the outset, the informational 'core' for compounding must be informational subtraction.

32. Compounding: $[F: x] \rightarrow [F: \ ]$

An example is found again in Luiseño. The operation adding the morph *-vichu* 'want to' requires stems that are specified [ASP: unchanging], but the resulting stems lack a value for ASP. Both facts are illustrated in 33. The requirement of an aspectual value in the operand is represented by the morph *-x* on the stems *heela* 'sing' and *pella* 'dance'; this is a morph like the three presented in 22 above. The fact that the combination with *-vichu* is [ASP:] is indicated by the presence of the tense/aspect morph *-q* 'present'; this morph is mutually exclusive with aspect, as demonstrated in Section 4.

33. heela**x**vichu**q** 'wants to sing'
pella**x**vichu**q** 'wants to dance'

The operation that adds the morph *-vichu*, thus, must destroy the aspectual information associated with the stem, consistent with 32.

34. *-vichu*:

Phon:	*X*		→	Phon:	*Xvichu*
Syntax:	CAT:	+abs		Syntax:	CAT: -abs
		+poss			-poss
	ASP:	unchanging			ASP:
	SUBCAT:	[...]			SUBCAT: [...]

The operation in 34 involves more than subtraction; it also modifies the value of CAT – [+abs, +poss] to [-abs, -poss]. Assuming that this is a reasonably representative example of compounding, it suggests that, like inflection and unlike derivation, compounding need not be informationally simple but can have multiple informational effects. Furthermore, the informational complexity for both compounding and inflectional operations involves the possibility that information can be modified as well as subtracted or added respectively.

35. Derivation: $[F: y^i] \rightarrow [F: y^j]$

Inflection: $\begin{bmatrix} (F^1: y^i) \\ F^2: \end{bmatrix} \rightarrow \begin{bmatrix} (F^1: y^j) \\ F^2: x \end{bmatrix}$

Compounds: $\begin{bmatrix} (F^1: y^i) \\ F^2: x \end{bmatrix} \rightarrow \begin{bmatrix} (F^1: y^j) \\ F^2: \end{bmatrix}$

The model in 35 makes a final prediction about the mapping between the three informational

options and the three morphological domains: No operation is simultaneously additive and subtractive.

6. Conclusion

Ex 35 maps the informational effects of addition, modification and subtraction onto traditional morphological divisions. But the primitives are the informational effects themselves. That is, the three-way informational division in 35 is a fundamental fact about morphological operations, whatever label might be applied to any of the three types. Thus, having established the primitive informational effects for morphological operations, we can consider a parallel to syntax. Although the standard view of syntax is not processual, the informational effects are arguably not exclusive to the morphological domain.

A prima facie case exists for the syntactic subtraction of information. This possibility is represented explicitly in the categorial grammar operation of functional application. For example, a transitive verb has the category VP/NP; application of this category to an NP yields a VP – VP/NP NP → VP. The combination of elements to yield many standard phrasal categories, in fact, involves the elimination of information associated with the 'non-head'. Informationally additive syntactic operations appear to be much more limited. Required is something that maintains (at least some of) the information in a syntactic domain while adding new information. The one reasonably good example might be the addition of clitics. For example, the Luiseño second position clitic complex supplies the speaker's assessment of the situation described in its complement. The contrast between the two sentences in 36 is illustrative.

36. a. noo n takwayaq 'I'm sick.'
I clitic.complex is.sick
b. noo kunun takwayaq 'I'm sick, I gather.'
I clitic.complex is.sick

Think of the complement to the clitic complex (e.g. *noo takwayaq*) as something with a temporal value. The clitic complex doesn't change or eliminate this value; rather, it adds to it a judgement. We might represent this as follows:

37. Clitic: [TNS: X] → [TNS: X; JUDGE: Z]

Finally, the requirements for informational modification limit the syntactic application. The one syntactic operation that arguably involves the replacement of one value with another of the same type is agreement across the members of a constituent. The most telling example is a case like Hopi where the dual is the result of a plural subject and a singular verb.

Although these syntactic examples demand further scrutiny, the potential parallels with morphology are intriguing. Intuitively, morphological compounds most closely resemble simple functor/argument relationships and cliticization is the most morphological part of syntax.

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