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Polarity and constraints on paradigmatic distinctness

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5.1 Introduction

Polarity is a type of syncretism where the syncretic items are distributed along the diagonals rather than the rows or columns of a paradigm. Polarity is only rarely found (and only rarely studied as a topic), but is not restricted to a particular linguistic area or language family.¹ It is debated whether it occurs accidentally or is a systematic phenomenon *sui generis*. Correspondingly, linguists either ignore the phenomenon or seek examples that can challenge common theoretical assumptions. One reason to consider polarity is that it seems difficult to learn. In this overview, only instances of morphological polarity are considered, brought about by affixes or ablaut. Subject-object reversals are excluded because they are regulated by independent means for mapping argument encodings to argument roles.

The notion ‘polarity’ was first proposed by Carl Meinhof (1912) to characterize the number–gender distribution found in some Afroasiatic languages (see section 5.5 below). A more formal definition was given by Hetzron (1967: 184):

[W]hen there exist two grammatical categories (*signifiés*) *X* and *Y*, and two corresponding exponents (*signifiants*) *A* and *B*, then value *X* can sometimes be assumed by *A*, while *B* denotes *Y*; and sometimes *X* is expressed by *B*, and then it is necessarily *A* that represents *Y*. In this manner, we obtain two paradigms: (1) *XA* vs. *YB*, and (2) *YA* vs. *XB*.

	context 1	context 2
category X	exponent A	exponent B
category Y	exponent B	exponent A

¹ See Albright and Fuß this volume for a general survey of syncretism and their section 7.3.1 for additional discussion on the role of polarity for syncretism.

Morphological polarity is a rare phenomenon. One apparent example is number marking in Dagaare (a Gur language of Ghana), where one class of stems is marked /e/ for singular and /ri/ for plural, while another class of stems is just reversely marked, namely /e/ for plural and /ri/ for singular. Obviously, it is difficult to learn under those circumstances whether a particular stem belongs to the first or the second class of items, and, simultaneously, that both /e/ and /ri/ express singular and plural, depending on the class of the noun they are attached to.

(1) 'Polarity morphology' in Dagaare (Anttila and Bodomo 2009)

	stem	sing	plur	
a.	bì-	bíé	bííri	'child'
	tí-	tíé	tííri	'tree'
	dè-	dié	dèri	'room'
	wè-	wíé	wèri	'farm'
b.	pì-	píri	pié	'rock'
	bí-	bíri	bié	'seed'
	yí-	yíri	yié	'house'
	mí-	míri	mié	'rope'

Another example of morphological polarity is shown by the transitivity marking in Japanese. Some verbs are underlyingly inchoative and receive causative meaning by the suffix /e/, while other verbs are underlyingly transitive and receive inchoative meaning by means of the same suffix /e/.

(2) Transitivity alternation in Japanese (Comrie 2006)

a.	ak-u	'open'	ak-e-ru	'open (tr.)'	Causative
	itam-u	'hurt'	tam-e-ru	'injure'	
	tat-u	'stand'	tat-e-ru	'raise'	
b.	nuk-u	'remove'	nuk-e-ru	'come off'	Anti-causative
	or-u	'break (tr.)'	or-e-ru	'break'	
	tuka-u	'use'	tuka-e-ru	'be usable'	

The polarity involved in these two examples is most clearly visible from the respective suffix-paradigms given in (3).

(3) a. Polarity in Dagaare b. Polarity in Japanese

	cls 1	cls 2
sg	e	ri
pl	ri	e

	cls 1	cls 2
inch	∅	e
caus	e	∅

Note that one dimension of these paradigms is given by the set of inflectional classes. That seems to be the case in most instances where some sort of polarity is observed. One might argue that if there is an independent motivation for classifying lexical items into class1 or class2, no conflict arises in having inflectional rules such as those in (4).

- (4) a. Dagaare: /-ri/ ↔ +pl/class1; /-ri/ ↔ +sg/class2; /-e/ elsewhere.
 b. Japanese: /-e/ ↔ +caus/class1; /-e/ ↔ +inch/class2; Ø elsewhere.

This solution states that there are in fact two different paradigms, one for class1 items and another one for class2 items, clearly distinguished, and the relevant affixes happen to be ambiguous in the described way.

The question is: What makes the members of class1 vs. class2 perspicuous enough to be distinguished? One possibility is a clear asymmetry in frequency: what in one class is a rule may turn out to be restricted to a small number of items in the other class, that is, one has to do it with a rule vs. exceptions (which accidentally show reversed exponents). In that case it is reasonable to assume that all word instances of the exceptional class are memorized, in contrast to the members of the regular class, which are productively formed. An example of this kind is cited by Baerman (2007:41, following Voegelin 1935), concerning aspect in Tübatulabal, a nearly extinct Uto-Aztecan language of California. In this language, telic stems usually derive from atelic ones through reduplication. In about thirty verbs, however, it is the atelic stem that derives from a telic one through reduplication. The reversal is thus restricted to a set of probably memorized items. (Note also that another small set of stems never reduplicate.)

Another possibility of class distinction is that the stems of one class accidentally end in segmental material that is identical to the morphemes added in the other class, and therefore another phonological shape of the morpheme is coined to enable the contrast. An example that comes into mind is the theme vowel of the Latin subjunctive, which is /a/ in most verb classes, but /e/ in all those verbs that have /a/ as the theme vowel (which happens to be the most productive class). (This example will be elaborated further in section 5.6.)

A third possibility of class distinction is that the members of class1 are semantically distinct from those of class2. (Of course, such a semantic distinction might be blurred by items that belong to a particular class only for historical reasons.) In causative–inchoative pairs (see (2)), for instance, the inchoative member is expected to be basic (semantically unmarked) if the verbal concept relates to a process that usually occurs spontaneously, without a specific external force ('freeze', 'dry', 'wake up'), while the causative member is expected to be basic if the verbal concept relates to a property that usually does not occur spontaneously ('close', 'break', 'split') (Haspelmath 1993). Comrie (2006) inspected a list of Japanese inchoatives in /-e/ (with 36 items) on the one hand, and a list of causatives in /-e/ (with 57 items) on the other, and found that expectation at least weakly confirmed for the first list: the more the verbal concept relates to a spontaneous process the higher the probability of being encoded as basically inchoative. Semantic distinction may thus interact with frequency. Moreover, many verbs in Japanese use other suffixes to mark causative or anti-causative (*ok-os-u* 'raise' – *ok-i-ru* 'get up', *kowa-s-u* 'destroy', – *kowa-re-u* 'be destroyed'), so that the issue of how much is learned, how much is inferred, and how much variation exists cannot be decided without closer inspection. (Semantic distinction will play a role in section 5.4 on inherent individuation.)

Some cases of alleged polarity involve subject–object switches. Baerman (2007) discusses pronominal suffixation in Amadiya (Northeastern Neo-Aramaic of Iraqi Kurdistan), following Hoberman (1989).

(5) Pronominal marking in Amadiya

- | | |
|--|--|
| a. qam-mpalt-ax-lu
PRET-remove-1PL-3PL
'we removed them' | b. mpult-ax-lu
removed-1PL-3PL
'they removed us' |
| c. qam-mpalt-i-lan
PRET-remove-3PL-1PL
'they removed us' | d. mpult-i-lan
removed-3PL-1PL
'we removed them' |

Amadiya has two sets of suffixes (A- and L-suffixes), where the A-suffixes (to which also /i/ belongs) are nearer to the stem than the L-suffixes. Verbs have five stems, among them the J-stem (general present, future, preterite, and subjunctive, distinguished by prefixes) and the P-stem (preterite only). With a J-stem (such as *qam-mpalt*) the argument order is subject–object, while with a P-stem (such as *mpult*) it is object–subject. One thus gets the paradigm in (6).

(6) 'Polarity' in Amadiya

	J-stem	P-stem
1plS/3plO	-ax-lu	-i-lan
3plS/1plO	-i-lan	-ax-lu

This paradigm is formed with word forms of one and the same verb, but with different stems of that verb, which are easily distinguished. Therefore, no problem arises for the learner to identify both the two sets of affixes and the respective meanings expressed by the sequence of affixes.

One might think that polarity also arises in the transitive–animate verbs of Algonquian. In these languages, the person–number affixes are usually not specified for subject or object (the same as in Amadiya); their interpretation arises in virtue of a direct vs. inverse marking system on stems. With direct stems, the subject ranks higher on the person scale (2 > 1 > 3proximate > 3obviative) than the object, while with inverse stems the reverse ranking holds. The respective paradigm in (8) shows systematic gaps.

(7) Direct-inverse marking in Ojibwe (Valentine 2001)

- | | |
|---|--|
| a. n-waabm-aa-min.
1-see-DIR-1PL
'We (excl) see him/them' | n-waabm-igo-min.
1-see-INV-1PL
'They see us (excl).' |
| b. g-waabm-aa-min.
2-see-DIR-1PL
'We (incl) see him/them' | g-waabm-igo-min.
2-see-INV-1PL
'They see us (incl).' |

(8) 'Polarity' in Ojibwe

	direct stem	inverse stem
1plS/3O	n-stem-min	*
3S/1plO	*	n-stem-min

One can say that the harmonic mapping found with direct stems (hp→hr, lp→lr 'the higher person is mapped to the higher role, and the lower person to the lower role') is negated in the presence of an inverse morpheme: hp→¬hr (=lr), lp→¬lr (=hr); nevertheless, this phenomenon is quite distinct from other types of polarity. This is because the 'direct' cells in (9), and similarly the 'inverse' cells, contain just one single stem assigning it a complex interpretation regarding subject and object.

(9) Direct vs. inverse mapping

	hr	lr
hp	direct	inverse
lp	inverse	direct

Subject-object reversals are therefore not considered further. But here, too, the person-number affixes attach to clearly distinct stems, so that no confusion can arise.

Only if one finds an instance in which the reversed affixes apply to one and the same stem, thereby yielding reversed interpretations, would a serious problem arise. For instance, if $\{/o/ \leftrightarrow 3\text{sg}, /i/ \leftrightarrow 2\text{sg}\}$ holds in the present, and the reverse in the past, but no separate marking of present or past is visible, the learner will obviously be confused. Indeed, such a system is impossible.

(10) A hypothetical instance of impossible polarity

	prs	pst
3sg	-o	-i
2sg	-i	-o

A system like (10), but with additional marking of the present or past stem, is, however, learnable in principle. Nevertheless it might be hard to process, and therefore unexpected or rare. The reason is that both exponents, /o/ and /i/, are ambiguous in a way that excludes underspecification (such as $2\text{sg}, 3\text{sg} \in [-1, -pl]$), while their respective meanings are similar enough to become confused, especially when the respective context, a present or past morpheme, is not particularly conspicuous by itself.

In the following I will demonstrate that a paradigm like (10), where the affixes apply to one and the same stem, is found only in one of the various instances of polarity reported in the literature, namely in Old French, but more restricted than (10), and embedded in a larger context of paradigm variation. All other examples of polarity are formed from different classes of stems which can be distinguished independently

by semantic or formal means. Moreover, these examples often constitute only partial polarity because they are embedded in a larger paradigm, or they result from independently motivated morphological means. The rest of this chapter is structured as follows:

In section 5.2, polarity is decomposed into diagonal syncretism on the one side (constituted by one feature marked, another feature unmarked) and full reversal on the other side (constituted by two features either both marked or both unmarked). Diagonal syncretism can play a systematic role in inflectional systems, as shown in section 5.3. Nevertheless, it challenges present theoretical tools. The description uses markedness features, related to a set of features that define a paradigm, such as <objective, plural> or <2nd person, feminine>.

Polarity, including full reversal, is mostly found when the Vocabulary items (stems) belonging to two different classes undergo reverse affixation. Section 5.4 considers number systems in which the noun classes are characterized by inherent plural or singular; what is marked, then, is unexpected number (described by NEG(F), where F is the inherent number feature), and sometimes also the expected number. Section 5.5 deals with the polarity induced by the number–gender interaction found in Somali; following Lecarme (2002), it is argued that number suffixes contribute their own gender, and therefore feminine singulars may become masculine plurals, and reversed, but there are also masculines that stay masculine in the plural. Section 5.6 investigates ablaut patterns found in the inflection of three unrelated languages (Arabic, Spanish, and Estonian), including partial reversal, where, for instance, /a/ becomes /i/, and /i/ becomes /a/. To describe this effect, the resulting vowel is assumed to be both underspecified and affected by a non-identity constraint.

The only clear case of full reversal with respect to single stems (rather than two different classes) is found in the number–case marking of Old French (section 5.7), which is unique because only a single suffix (/s/) was available to distinguish two cases and two numbers, with different distributions in the different vocabulary classes. The proposed recursive paradigm construction uses pairwise comparison of cells by means of specific contrast constraints, elaborating an earlier proposal by Lahne (2007).

I will come to the conclusion that there is nearly no motivation for polarity as an independent concept. The concept that is necessary (and actually always present in paradigms) is contrast, which is differently implemented using the theoretical tools developed here.

5.2 Polarity and other types of paradigms with nondistinct cells

A paradigm is a set of form–function pairs in which each form is derived from a stem (possibly chosen from a set of stems) with a certain core meaning, and each function modifies that meaning. Usually the function is given by a set of independent (orthogonal) categories, considered as particular values of a category domain (or dimension), such as {prs, pst} = TENSE, {1, 2, 3} = PERSON, {sg, pl} = NUMBER, etc. Those values might also be represented by more primitive features receiving a unique

interpretation. The complex word forms belonging to a paradigm can show values of several (say, n) category dimensions; the corresponding paradigm then has n dimensions. Only because of the restriction imposed by writing the form–function pairs on a sheet of paper, paradigms are represented two-dimensionally (either by conflating dimensions or by representing them in layers). The vertical and the horizontal axes each represents a dimension, while the contents of the cells represent the respective word forms. Of course, only if one can contrast two different word forms according to their meaning, or contrast two different meanings according to the word forms by which they are expressed, can one arrive at a nontrivial paradigm.

Given the most simple case of a paradigm with two two-valued dimensions, shown in (11), several subtypes can be distinguished. In [1], no word forms can be contrasted, so both dimensions turn out to be irrelevant; in other words, there is no paradigm. In [2], only dimension g is relevant, so the paradigm reduces to a one-dimensional one. All the remaining paradigms are two-dimensional. Paradigm [9], in which all cells are distinct, is optimal, whereas [3] to [8] show various ways in which distinctness is violated.

The values are distinguished by \pm features. Assume that a +feature corresponds to the presence of an interpretation, while a –feature corresponds to the absence of that interpretation; then a word form bearing a +feature (the marked value) is differently judged from a word form bearing the unmarked value; the latter can easily be regarded as a default form, while the former cannot. Moreover, identity of word forms along a diagonal with $[-f, -g]$ and $[+f, +g]$ is differently judged from identity along a diagonal with $[+f, -g]$ and $[-f, +g]$.

(11) Some simple types of paradigm

[1]		
	-g	+g
-f	a	a
+f	a	a

[2]		
	-g	+g
-f	a	b
+f	a	b

[3]		
	-g	+g
-f	a	a
+f	a	b

[4]		
	-g	+g
-f	a	b
+f	b	b

[5]	polarity	
	-g	+g
-f	a	b
+f	b	a

[6]		
	-g	+g
-f	a	c
+f	b	c

[7]	diagonal syncr.	
	-g	+g
-f	a	b
+f	b	c

[8]	full reversal	
	-g	+g
-f	a	c
+f	b	a

[9]		
	-g	+g
-f	a	c
+f	b	d

Paradigm [3] can be described by $\{/b/\leftrightarrow [+f, +g], /a/\text{ elsewhere}\}$. For the complementary paradigm [4] one might choose $\{/a/\leftrightarrow [-f, -g], /b/\text{ elsewhere}\}$, but then it remains mysterious why the designated form bears the unmarked values; therefore

the disjunctive specification in $\{/b/\leftrightarrow [+f \vee +g], /a/ \text{ elsewhere}\}$ seems more adequate. It is reasonable to assume that $[-f, -g] \in \{\text{'elsewhere'}\}$.

None of these strategies is helpful for paradigm [5], which exhibits polarity. One possible description makes use of a variable over feature values (similarly to what has been proposed in the phonology of the 1960s²): $\{/a/\leftrightarrow [\alpha f, \alpha g], /b/\leftrightarrow [\alpha f, -\alpha g]\}$, where $\alpha \in \{+, -\}$. However, the use of such a variable does not express any additional generalization; it states the ambiguity involved only more indirectly.

Paradigm [6] is similar to [2] but more detailed, so that the dimension $\{-f, +f\}$ becomes motivated.

Regarding the theoretical status of polarity, most interesting are paradigms [7] and [8]; they suggest that the notion of polarity can be decomposed. Paradigm [7] is an instance of *diagonal syncretism*: identical exponents show up only if one feature is marked, the other unmarked, thus establishing the idea that not the individual categories but rather the minimal contrast in markedness is marked, regardless of the category involved. By contrast, [8] shows *full reversal*: identical exponents show up only if both features are either marked or unmarked, thus establishing the idea that the maximal opposites should be marked in the same way, which is admittedly a rather odd idea.

In fact, if one inspects the empirical variation within paradigms, one finds many instances of diagonal syncretism, but hardly any clear instance of full reversal (except in Old French, a very special case; see section 5.7). That suggests that it is full reversal that makes strong polarity (as that given in (10)) problematic, while diagonal syncretism does not raise any issues with respect to language acquisition.

If one decomposes polarity into diagonal syncretism and full reversal one can identify two factors that impose different processing constraints. One is that an increase in markedness is informative; it requires inspecting the context to find out which of the categories involved is more salient: Is $[-f]$ or $[-g]$ the category value to be fixed in the interpretation? The other factor is not informative for a given domain because markedness is either maximal or minimal; it rather requires shifting the perspective from one set of conditions in which category $[-f]$ is inherently favored to another set of conditions (the marked set) in which category $[+f]$ is inherently favored. In

² Chomsky (1967) and Chomsky and Halle (1968) propose exchange rules (' α -rules,' using a variable over feature values) in order to describe the effects of the English vowel shift. The classical format is $[\alpha F] \rightarrow [-\alpha F]/C$. These rules have to apply simultaneously and not sequentially; it is therefore excluded that the output of one application becomes the input of another application. It was not immediately clear whether there exist similar exchange phenomena in languages other than English. Examples which were mentioned in the early literature include the vowel exchange in Arabic imperfective-perfective forms and in Modern Czech, the long \leftrightarrow short stem vowel shift in the Dinka plural, and the voiced \leftrightarrow devoiced shift in the Luo plural, both these last being Nilotic languages. Anderson and Browne (1973), in summarizing the state of research at that time, suggested "that the class of segmental exchange rules is limited to the domain of morpholexical processes" (p. 463). This rather far-sighted statement includes two facets: (i) segmental exchange is a way of providing morphological contrast in the presence of certain featural properties; (ii) every instantiation of α (+ or -) is restricted to subclasses of the vocabulary, depending on whether $[+F]$ or $[-F]$ shows up in the particular item underlyingly. Fitzpatrick et al. (2004) argue that exchange rules do not require variables for feature values; they require negation and less specified descriptions. The rule $[\alpha F] \rightarrow [-\alpha F]/C$ collapses to $\text{NEG}(F)/C$ ('For each F, negate F in the context C'). Thus, plural \leftrightarrow NEG(length) would be short for the Dinka plural.

particular, these different sets of conditions could be constituted by certain classes of items. Assuming that $[-f]$ is expected in class $[-g]$, and $[+f]$ in class $[+g]$, full reversal makes sense because $[+f,+g]$ becomes comparable to $[-f,-g]$ from the point of markedness. These two cells contain what is expected, while the two diagonal cells contain what is unexpected. Clearly, unexpected values should be marked, while expected values don't need to be. In sum, this consideration implies that one dimension of a polarity paradigm is a class feature, and that diagonal syncretism is more likely to appear than full reversal.

5.3 Diagonal syncretism

A typical diagonal syncretism is found in Hindi (Arsenault 2007; D is a retroflex).

(12) Hindi case–number inflection

a. masculine (class II) noun stems			b. masculine adjectives		
'boy'	sg	pl	'big'	sg	pl
NOM	laDk- aa	laDk-e	NOM	baD- aa	baD-e
OBL	laDk-e	laDk- ō	OBL	baD-e	baD-e

With masculine nouns, the syncretic $/-e/$ marks complementary sets of features: $[NOM,pl]$ on the one hand and $[OBL,sg]$ on the other, while with masculine adjectives, $/-e/$ is generalized and also covers $[OBL,pl]$. Given such a distribution, it is usually assumed that $/-e/$ is a default masculine suffix, which is underspecified for number and case. But this conflicts with another assumption, namely that the domain of a default affix includes the unmarked features, which is not the case here; it is $/-aa/$ that uniquely marks $[NOM,sg]$. In order to solve that conflict, one of these assumptions must be given up.

Consequently, several alternative descriptions are possible. In (13a) it is assumed that the default affix realizes the unmarked features; therefore, $/-e/$ is characterized by a disjunctive entry, and it is predicted that this item generalizes: In the presence of a more specific item, the disjunction gets the exclusive reading 'either – or', while in the absence of such an item, it gets its normal inclusive reading.³ The reverse assumption is taken in (13b): here, $/-e/$ is assumed to be the default affix in the presence of an item that is marked for the unmarked features ($/-aa/$). It is predicted that the default item can generalize. (13c) is a notational variant of (13b): I cannot see

³ A reviewer asked: Why is this not just accidental homophony? My answer has three parts. First, the disjunction covers in fact three possibilities, consider (12b). Second, homophony concerning diagonal cells is not such a rare phenomenon as the notion 'accidental' suggests. Third, in particular, when paradigms collapse, the remaining affixes seem to be organized along lines that can best be described in view of the whole paradigm.

any substantial difference between a feature-geometric representation (such as that of Arsenault 2007) and the more usual binary feature representation.

(13) Hindi vocabulary items (masculine class II noun stems)

a. /-ō/ ↔ [+OBL ∧ +pl]

/-e/ ↔ [+OBL ∨ +pl]

/-aa/ ↔ elsewhere

In adjectives, the ‘disjunctive’ item generalizes.

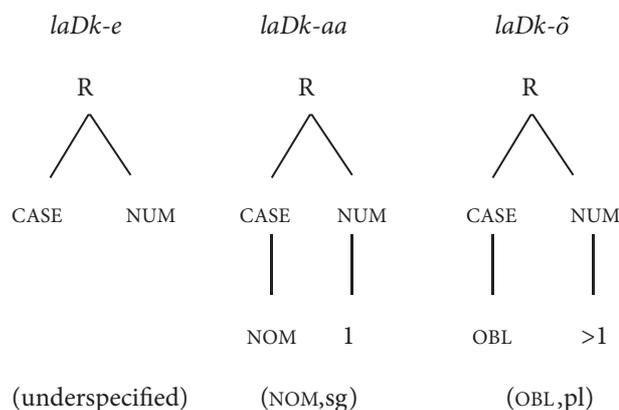
b. /-ō/ ↔ [+OBL,+pl]

/-aa/ ↔ [-OBL,-pl]

/-e/ ↔ elsewhere

In adjectives, the ‘elsewhere’ item generalizes.

c. (Arsenault 2007; R stands for ‘root’):



In adjectives, the underspecified item generalizes.

Both alternatives, (13a) and (13b,c), seem to account for the same generalization. A strong notion of ‘default’ (including the most unmarked cell), decides in favor of option (13a), while the larger extension of ‘elsewhere’ speaks for option (13b,c). There is a further possible way to describe the Hindi system which avoids the explicit use of default affixes; (14) rather makes use of the super-values [mF] ‘at least one of the features of the paradigmatic domain F is plus-valued’ and [uF] ‘all features of F are minus-valued.’

(14) Markedness account of the Hindi case–number inflection

/-ō/ ↔ [+OBL,+pl]

/-e/ ↔ [mF]

/-aa/ ↔ [uF]

In adjectives, the [mF] item generalizes.

Here, /-ō/ ↔ [+OBL,+pl] defines a certain paradigmatic domain $F = \langle \text{OBL,pl} \rangle$. Assuming that /-e/ and /-aa/ belong to the same domain, they have to contrast with /-ō/ and with each other, that is, the case–number domain of Hindi is paradigmatically

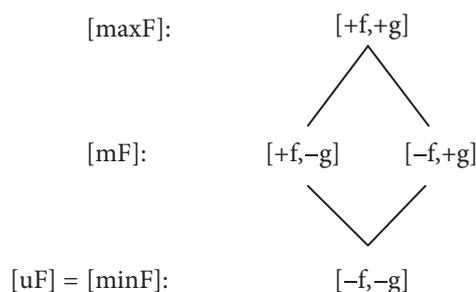
defined as $\{-\delta/, /-e/, /-aa/\} \leftrightarrow \langle \text{OBL}, \text{pl} \rangle$. Then, [uF] and [mF] get their interpretation from that specific domain: [uF] becomes $[-\text{OBL}, -\text{pl}]$, while [mF] is saturated with $[\text{+OBL}]$ or $[\text{+pl}]$.

(15) *Paradigmatic markedness*

Given a certain domain F of binary features $F = \langle f, g \rangle$, and the vocabulary items $/a/ \leftrightarrow [\text{uF}]$ and $/b/ \leftrightarrow [\text{mF}]$ within that domain, then $/a/$ can only be associated with minus-values, and $/b/$ must be associated with at least one plus-value.

One can further identify [uF] with [minF], and state that $-\delta/$ is associated with [maxF] in that particular domain. Thus, three markedness features are possible in a domain, ranked as $[\text{maxF}] > [\text{mF}] > [\text{minF}]$. Consider the lattice in (16).

(16) Markedness features



Now, what happens in a system under the description (14), when the leading form $[\text{+f}, \text{+g}]$ becomes absent? One has to postulate that the remaining affixes still belong to the same domain, so that within that domain only the marker [mF] can be extended.

(17) Masculine adjectives in Hindi

$\{-e/, /-aa/\} \leftrightarrow \langle \text{OBL}, \text{pl} \rangle$
 $/-e/ \leftrightarrow [\text{mF}]$
 $/-aa/ \leftrightarrow [\text{uF}]$

Another well-known example of paradigmatic (un)markedness is English $/-s/$, which marks the most unmarked category combination 3sg present (*he come-s* vs. *I come*, *they come*, *he came*).

(18) Person–number in the English verb

$\{-s/\} \leftrightarrow \langle \text{PAST}, 1, 2, \text{pl} \rangle$
 $/-s/ \leftrightarrow [\text{uF}]$
 (One might add $/\emptyset/ \leftrightarrow [\text{mF}]$, but I think that follows from this representation.)

The assumption that affixes belong to a certain domain is tacitly made by every account of inflection, so it does not come as a surprise. In the beginning, learners acquire the inflected words holistically, and only later they find out possible

segmentations into stems plus affixes by pairwise contrast; that means that they are able to identify (in a way, to ‘remember’) from which domain of words they abstracted which affixes.

It should be clear by now that reversals cannot be represented in that way because one and the same item would be associated with both [minF] and [maxF]. But because we have found an adequate representation of diagonal syncretism, we expect it to appear more readily than reversal. Indeed, many more examples of diagonal syncretism can be found.

Kashmiri shows it in one of its noun declension classes, just like Hindi in (12a) (see Baerman 2005; Kashmiri ablative and dative are omitted because they are irrelevant for the issue under consideration). A similar distribution is also found in Old Church Slavonic (see Béjar and Hall 1999; here, locative, dative, and instrumental are irrelevant).

(19) Kashmiri noun declension class2

‘tree’	sg	pl
ABS	kul	kul’
ERG	kul’	ku’av

(20) Old Church Slavonic neuter noun and adjective suffixes

	sg	pl
NOM/ACC	-o	-a
GEN	-a	-θ

The distribution that we saw in Hindi masculine adjectives (12b) is also found in the nominative forms of the German (non-neuter) definite article: *der* appears here as [uF] and *die* as [mF] in the domain <fem, plur>, see (21). Similar examples are found in German dialects, for instance, all verbs in Luxembourgish show the syncretism [+1 ∨ +pl], see (22).

(21) NHG definite article nominative form

	sg	pl
masc	der	
fem	die	

(22) Luxembourgish *sin* ‘be’, *hun* ‘have’, and *gin* ‘go’ (Nübling 2000)

	sg	pl		sg	pl		sg	pl
3	as		3	hue-t		3	gee-t	
1	sin		1	hu-n		1	gi-n	
2	bas	sid	2	hue-s	hu-t	2	gee-s	gi-t

In subject–object conjugations, syncretism is often found among the plurals. For instance, /miz'/ in Erzya (Mordvin, Uralic) is a plural morpheme in the presence of 1st person object; however, it is unspecified of whether it marks plurality on the subject or the object (or both) (Keresztes 1999). A similar general plural morpheme is /ku/ in Ayacucho-Quechua (Lakämper-Acebey 2001).

(23) Subject–object conjugations in Erzya and Ayacucho (partial paradigms)

a.		1sgO	1plO
	3sgS	-sa-mam	
	3plS		-sa-miz'

b.		1sgO	1plO
	3sgS	-wa-n	
	1plS		-wa-n-ku

Diachronically, a pluractional verb affix (i.e. one that marks multiple events) might have shifted to a plural marker for subject or object. There is evidence that this indeed happened in Quechua (Lakämper-Acebey 2001). Such a line of reasoning might explain why a particular diagonal syncretism came into existence.

A diagonal syncretism characteristic for a whole language family is found in the person prefixes of the Afroasiatic languages (see also Gragg 2004): (24) shows a distribution preserved for thousands of years in several related languages. Ugaritic (1600–1200 BC) has it, as do Berber, Bedja (Cushitic), Arabic, Hebrew, and Maltese (and probably more languages). (Further prefixes mark first person singular or plural; they are omitted here because they differentiate number and not gender.)

(24) Afroasiatic person prefixes on the verb

	masc	fem
3	y-	
2		t-

Interestingly, two variants exist of this distribution:

(25) a.		masc	fem
	3	y-	
	2	t-	

b.		masc	fem
	3	y-	t-
	2	t-	t-stem-i

Gender neutralization as seen in (25a) is characteristic for Akkadian, as well as for the plural in Arabic, Hebrew, Maltese, Berber, and Bedja (but not in Ugaritic), while the particular distribution in (25b) arises in virtue of additional suffixation, like in the Hebrew singular, and similarly (with /-u/ instead of /-i/) in the Ugaritic and Arabic singular. Having the system (24) in the singular and dual, and the system (25a) in the plural, is, however, a challenge for the representation of prefixes. The present account proposes the specification in (26b) for Arabic; for the sake of completeness, the prefixes for 1st person are given in (26a). Note that gender distinction is only

required for 3sg (i.e. [uF] in the subdomain $\langle 1,2,pl \rangle$), while otherwise contrast in person outranks contrast in gender. The CONTRAST ranking in (26c) guarantees that the pattern (25a) is optimal for the plural, while (24) is optimal for the non-plural (singular and dual); it also predicts gender neutralization in the first person.⁴ CONTRAST(person) is violated if a minimal difference in person is not realized by corresponding different forms, similarly for the other dimensions. Such a general constraint can be relativized to a certain subparadigm, e.g. that for 3sg (for more on CONTRAST see sections 5.6 and 5.7). A formal definition of paradigm contrast is given in Rebrus and Törkenczy (2005); see also Kenstowicz (2005).⁵

(26) Prefixation in the Arabic imperfective

a. First person:

/n-/ ↔ [+1,+pl]

/ʔ-/ ↔ [+1]

b. Non-first person, with $F = \langle 2, fem \rangle$

/t-/ ↔ [mF]⁶

/y-/ ↔ [uF]⁷

c. CONTRAST(gender)/3sg » CONTRAST(person) » CONTRAST(gender)

⁴ An alternative way of characterizing neutralization is by means of impoverishment rules such as $fem \rightarrow \emptyset/C$ with $C =$ participant person or plural. Note that the suffix system does not show gender neutralization in the second person, see (25b). Thus, in any case, constraint ranking/impoverishment in suffixation is different from that in prefixation.

⁵ “CON relativized to the morphosyntactic dimension $D = \text{CON}(D)$. A form realizing some value of a morphosyntactic dimension D of paradigm x must be phonetically distinct from forms realizing other values of D .” (Rebrus and Törkenczy 2005:266). These authors argue that the ranking $\text{CON}(\text{person/number}) \gg \text{CON}(\text{definiteness})$ is responsible for the definiteness neutralization in Hungarian, occurring in some specific forms. More precisely, the expected 1sg indefinite past form **akar-t-ak* ‘I wanted something’ is blocked in the presence of an identical 3pl form, so that both definite and indefinite 1sg past is *akar-t-am*. Likewise, the expected 1pl definite conditional form **akar-ná-k* ‘if we want that’ is blocked in the presence of an identical 3pl form, so that both definite and indefinite 1pl conditional is *akar-ná-nk*. The conclusion is: definiteness in the 1st person is neutralized just in order to avoid homophony with a 3pl form.

⁶ Harbour (2009b) argues that /t-/ is ambiguous between 2nd person and default. He counts as evidence for /t/ being a specific 2nd person affix that /-t/ appears in some 2nd person contexts as a suffix. For him, there is no principled difference between affixes used as a prefix or a suffix.

⁷ One reviewer remarked that 3masc.sg could be singled out for special marking because individual male referents have a high value in certain cultural conditions. It is precisely this view that is reflected in the dominance of $\text{CONTR}(\text{gender})/3\text{sg}$. Note, however, that the cultural view cannot so easily explain why gender is neutralized in the plural.

Given the two entries in (26b), /t-/ must at least be associated with [+2,+fem], and /y-/ with [-2,-fem]=3masc (where number can freely be instantiated), while the markers for the two diagonal cells could be either /t-/ or /y-/ (dependent on number). The choice is regulated by the constraint ranking, as shown in (27).

(27) Evaluation of Arabic imperfective prefixation

a.	2masc	CONTR(gender)/3sg	CONTR(person)
	/y-/		*
	تـ /t-/		

b.	3fem.pl	CONTR(gender)/3sg	CONTR(person)
	يـ /y-/		
	/t-/		*

c.	3fem.sg	CONTR(gender)/3sg	CONTR(person)
	/y-/	*	
	يـ /t-/		*

Note that CONTRAST is, like [uF] and [mF], defined for a certain paradigmatic domain (such as <2,fem,pl>); therefore, an account in terms of markedness and CONTRAST in a certain way admits the ‘reality’ of paradigms (which, implicitly, is done in every account of underspecification, because it is relativized to a domain). However, the present account avoids the evaluation of whole paradigms (paradigm optimization in the sense of McCarthy 2005), instead, it constructs a paradigm step by step in that it pairwise compares individual cells (see Wunderlich, 1996, for a similar concept of paradigm construction).

5.4 The role of inherent individuation in determining number

In this section, some polarity patterns occurring in number marking are considered. First, the Dagaare system, presented in (1) above, is briefly reviewed. It turns out that inherent individuation plays a role in determining the subclasses of the vocabulary. Similar properties are reported from Nehan, an Oceanic language, and the Kiowa-Tanoan languages, spoken in Southwest USA.

Anttila and Bodomo (2009) argue that Dagaare nouns require the presence of a bimoraic foot. Therefore, short stems (those that are shown in (1a) above) seem to epenthesize a vowel in the singular rather than to add a singular morpheme. Evidence comes from three observations: long stems do not need an additional vowel (28a), the quality of the inserted vowel is determined by the last stem vowel (28b), and the inserted vowel does not need to be final (28c).

(28) Further data about Dagaare class1 nouns

	stem	singular	plural	
a.	tùù-	túú	túúrí	'forest'
	pòlìsì-	pòlìsì	pòlìsìrí	'police'
b.	kù-	kúó	kúúrí	'wild rat'
	bū-	būɔ	būurí	'goat'
c.	dè-	dié	dèrí	'room'
	dò-	dùó	dòrí	'pig'

By contrast, /e/ in the plural of class2 nouns (or the vowel that corresponds to it) appears also with long stems (29a), is always unrounded and located after the stem (29b).

(29) Further data about Dagaare class2 nouns

	stem	singular	plural	
a.	vààl-	váálí	váálá	'rubbish' (/váál+ri/ → [váálí])
	gyíl-	gyílí	gyílé	'xylophone' (/gyíl+ri/ → [gyílí])
b.	pò-	pùòrí	pòé	'back'
	yó-	yúórí	yòé	'name'

The conclusion from these two sets of data is that the actual number system of Dagaare (30) shows diagonal syncretism with /ri/, but not full reversal (polarity).

(30) Number in Dagaare (revised)

	cls 1	cls 2
sg	∅	-ri
pl	-ri	-e

(One can verify that (30) indeed represents diagonal syncretism and not reversal: plural is semantically more marked than singular, and class2 items are more marked than class1 items because they are less individuated.) Since, however, very similar systems such as those to be presented below show clear cases of reversal, it is not that important if one can argue it away in the case of Dagaare.

Grimm (2010) asks why /ri/ sometimes marks plural and sometimes singular. He argues that highly individuated nouns (in particular those that denote humans or big animals) take /ri/ as a plural marker, while less individuated or inherently plural nouns (denoting 'seed', 'log', 'root', 'sores', 'horn', etc.) take /ri/ as a singular marker; thus, /ri/ gives the value of number that is less expected from the mental representation of the noun's denotation. With other words, /ri/ is associated with the marked feature semantically, while /-e/ is associated with the unmarked feature of the marked class.

For the representation one has to distinguish between inherent and morphologically induced features. One way of doing so is guided by the assumption that inherent features are always minus-valued but can be overridden by morphological means. Inherent singular then is marked [-pl], and inherent plural is marked [-sg]. This means that the suffix /-ri/ can uniquely be represented as NEG(F), where F must be

inherent; each class introduces its own feature, and the correlation between singular and plural becomes a matter of interpretation (31a).

Another possibility is to introduce a separate feature for inherent properties, which, of course, does not need to be independent semantically. Let us assume that [distributed] is such a feature, with inherently plural nouns being [+distr]. In that case, /-ri/ is always associated with a marked feature (i.e. [+pl] or [+distr]), see (31b). (Representations using supervalues such as [mF] were introduced for diagonal syncretism in section 5.3.) Notice that /-ri/ is more specific than /-e/ in (31a), but less specific than /-e/ in (31b).

Finally, one can mix features of the first and the second account by using only plural as a feature; in that case, both the inherent and the morphologically triggered features are either [-pl] or [+pl], see (31c). Consider also the corresponding paradigms in (32).

(31) Three ways of feature specification in Dagaare number

- a. class1 → [-pl], class2 → [-sg]
 /-ri/ ↔ [+F]/[-F],
 or simply /-ri/ ↔ NEG(F) ('The respective inherent feature is reversed')
 /-e/ ↔ [+pl]
- b. class1 → [-distr], class2 → [+distr]
 /-ri/ ↔ [mF]
 /-e/ ↔ [+pl, +distr]
- c. class1 → [-pl], class2 → [+pl]
 /-ri/ ↔ NEG(F)
 /-e/ ↔ [+pl]/[+pl]

(32) The corresponding affix paradigms

a.		-pl	-sg
	+sg	∅	-ri
	+pl	-ri	-e

b.		-distr	+distr
	-pl	∅	-ri
	+pl	-ri	-e

c.		-pl	+pl
	-pl	∅	-ri
	+pl	-ri	-e

The choice between these three descriptive options depends on conceptual motivations. Do we want inherent features to be different (always '-' valued or of a different sort), or do we want the simplest system of features (such as (31c))? Is the inherent property of the respective nouns really a number feature, or is it a property to be mapped onto the morphological feature system? Is morphology able to change inherent features, or is it even a design property of morphology to do so? (Note that *pluralia tantum* known from Indo-European languages usually do not allow morphological singular.) Questions of this sort are discussed in Acquaviva (2008). In any case, /-ri/ ↔ NEG(F) is well motivated here, because it means that unexpected number should be marked by /-ri/. It is an open question whether in principle, then, also /α/ ↔ (F) ('Mark the expected number by /α/'), i.e. full reversal, should be allowed, even if such a marker is less motivated conceptually.

Note that the affix paradigms in (32) will never lead to corresponding noun paradigms, because every single noun exclusively undergoes either affixation by items of the left column or by those of the right column (depending on its class membership), thus, these ‘paradigms’ disintegrate into two independent ones after affixation has taken place.

Inherent individuation also plays a role in some other instances of apparent polarity. Baerman (2007) cites an example from Nehan, an Oceanic language, where the choice of article depends on number and noun class, as illustrated in (33).

(33) Nehan articles

a. topic/subject definite article			b. indefinite article		
	class1	class2		class1	class2
sg	a	o	sg	me	mo
pl	o	a	pl	mo	me

According to Ross (1988), class1 nouns correspond roughly to count nouns, and class2 to non-count nouns. This means that the analysis proposed for Dagaare can be applied here, too. For instance, /o/, /mo/ can be associated with the ‘unexpected’ feature, while /a/, /me/ constitute the ‘elsewhere’ case: /o/ ↔ NEG(F), /a/ ↔ elsewhere.

Another example that clearly demonstrates the role of inherent number in morphology is the number marking in Kiowa (Wonderly et al. 1954). There is only one single number morpheme, the suffix /-gɔ/ (with the variant [-dɔ]), which has a remarkable distribution. With class1 nouns, it marks plural, with class2 nouns singular, and with the rarely attested class3 nouns dual. Finally, class4 nouns take no suffix. (In order to make the singular–plural syncretism of class3 visible in (34), a further singular row is added.)

(34) Kiowa number marking

	class1	class2	class3	class4
	‘horse’	‘bone’	‘tomato’	‘rock(s)’
singular	che:	tósè -gɔ		t ^h òn
dual		tósè	k’on	
plural	che:-gɔ		k’on-dɔ	
singular				

Animates (more generally, ‘independently mobile objects’) mostly belong to class1, vegetation, implements and body parts to class2, mid-size fruits growing in clusters (as well as hair growing in natural collections, such as head hair and eyebrows)

to class3, and various inanimates (such as shoe, boot, rock, key) belong to class 4 (Harbour 2011). Let us assume that all members of class1 to class3 have inherent number features, dependent on whether they are salient as individuals or collections; animals are single or form pairs (e.g. male and female), the members of class2 (such as bones, arrowheads, etc.) usually appear in groups (numbering > 1), while a few items are classified simultaneously as individuals and collections (class3).⁸ Class4 can be assumed to be the default class. To deal with this number distribution, Noyer (1992) and, following him, Harbour (2003, 2007), propose the feature domain $F = \langle \text{sg, aug} \rangle$. If the three numbers are represented as in (35a), class1 items can be attributed with the inherent feature $[-\text{aug}]$, those of class2 with $[-\text{sg}]$, and the few items of class3 with $[-\text{sg}, -\text{aug}]$ (which shows that they are more marked inherently).⁹ The function of $/-g\text{ɔ}/$ is to derive the respective plus-features; so $/-g\text{ɔ}/$ can be associated with the ‘unexpected’ feature; in the description of the Kiowa-Tanoan languages, this morpheme traditionally is called ‘inverse’.

(35) Kiowa number features

- a. $\text{sg} = [+ \text{sg}, - \text{aug}]$ b. $/-g\text{ɔ}/ \leftrightarrow \text{NEG}(F)$
 $\text{du} = [- \text{sg}, - \text{aug}]$
 $\text{pl} = [- \text{sg}, + \text{aug}]$

(36) Inherent and inverse features in Kiowa number marking

		inherent feature		derived feature
class1	che:	$[-\text{aug}] = \{\text{sg}, \text{du}\}$	che:-gɔ	$[+\text{aug}]$
class2	tósè	$[-\text{sg}] = \{\text{du}, \text{pl}\}$	tósè-gɔ	$[+\text{sg}]$
class3	kʔon	$[-\text{sg}, -\text{aug}] = \text{du}$	kʔon-dɔ	$[+\text{sg} \vee +\text{aug}]$

Kiowa intransitive verbs agree with their subjects. Interestingly, the prefix $/e-/$ occurs on the verb under exactly those circumstances where $/-g\text{ɔ}/$ is attached to the noun. Otherwise, one finds \emptyset for class1 singulars $/á-/$ for class1 humans $/gyà-/$ for class2 plurals, and a nasalized $/e^N-/$ elsewhere; in every case, $/e-/$ is preferred, see (37d). Thus, the verb agrees with the inverse feature of the inflected noun, while with uninflected nouns it is able to instantiate a more fine-grained distinction than is provided by the inherent features. Transitive and ditransitive verbs can, in addition, agree with their objects, again under similar circumstances (Harbour 2003, 2007).

⁸ As in general, class membership is not necessarily determined semantically (although it is in prototypical instances). Therefore, ‘expected number’ is ultimately a purely formal property, like ‘expected sex’ in a gender system with masculine and feminine.

⁹ In the number system proposed by Steins (2000) for Kiowa ($+\text{plural} \geq 2$, $+\text{paucal} \leq 2$), all the inherent number features are plus-valued, with is counterintuitive. In particular, $/-g\text{ɔ}/$ then derives only unmarked features.

(37) Kiowa number marking on verbs and nouns (Harbour 2011)

- a. $\acute{\text{ó}}\acute{\text{p}}\acute{\text{í}}^{\text{N}} \text{ } \emptyset\text{-d}\acute{\text{o}}$ (class1) *singular*
 fish 3SG-be
 ‘It’s a fish.’
- b. $\acute{\text{ó}}\acute{\text{p}}\acute{\text{í}}^{\text{N}} / \text{k}^{\text{on}} / \acute{\text{á}} \text{ } e^{\text{N}}\text{-d}\acute{\text{o}}$ *dual*
 fish/ tomato/ stick 3DU-be
 ‘It’s two fish / two tomatoes / two sticks.’
- c. $\acute{\text{á}} \text{ } \text{gya- d}\acute{\text{o}}$ (class2) *plural*
 stick 3PL-be
 ‘It’s some sticks.’
- d. $\acute{\text{ó}}\acute{\text{p}}\acute{\text{í}}^{\text{N}}\text{-d}\acute{\text{o}} / \text{k}^{\text{on}}\text{-d}\acute{\text{o}} / \acute{\text{á}}\text{-d}\acute{\text{o}} \text{ } e\text{-d}\acute{\text{o}}$ *inverse*
 fish.INV /tomato-INV /stick-INV 3INV-be
 ‘It’s some fish / a tomato / some tomatoes / a stick.’
- e. $\text{X}^{\acute{\text{o}}\acute{\text{u}}} \text{ } \emptyset/e^{\text{N}}/\text{gya-d}\acute{\text{o}}$ (class4)
 stone 3SG/3DU/3PL-be
 ‘It’s a stone / two stones / some stones.’

Other members of the Kiowa-Tanoan family show inverse marking on nouns and inverse agreement, too. Most puzzling is the distribution of number marking in Jemez, which is reverse to that in Kiowa, as shown in (38). While in Kiowa all duals are unmarked, they are marked in Jemez (Spratt 1992).

(38) Jemez number marking (Harbour 2009a)

	class1	class2	class3
	‘deer’	‘drum’	‘bread’
singular	pæ·	pó·-š	
dual	pæ·-š		bélæ -š
plural		pó·	bélá
singular			

If one proceeds in the same way as in Kiowa, one must postulate the analysis in (39), in which everything is reversed.

(39) Inherent and inverse features in Jemez number marking (preliminary)

		inherent feature		derived feature
class1	pæ·	[+sg] = sg	pæ·-š	[-sg] = {du,pl}
class2	pó·	[+aug] = pl	pó·-š	[-aug] = {sg,du}
class3	bélá	[+sg ∨ +aug] = {sg,pl}	bélæ -š	[-sg,-aug] = du

However, it is curious why a related language should use totally different inherent features, even though class membership is similar to that in Kiowa. Animates belong to class1, and vegetation, complex artifacts, and body parts belong to class2. Harbour (2011) instead assumes (i) that the former class3 (which was a small one) has merged with the default class (the former class4), and (ii) that the inverse morpheme (in (40b)) acquired the further (more specific) function of marking dual, represented in (40a). With these two changes, the inherent features of class1 and class2 become relevant only in the singular or plural, see (41).

- (40) a. /-š/ ↔ [-sg,-aug]
 b. /-š/ ↔ NEG(F)

- (41) Inherent and inverse features in Jemez number marking (revised)

		inherent feature		MARK(dual)	derived feature
class1	pæ·	[-aug] → sg	pæ·-š	du	[+aug] = pl
class2	pó·	[-sg] → pl	pó·-š	du	[+sg] = sg
class3	béla		bélae -š	du	

This seems to be the essence of Harbour's analysis, which, however, is slightly more complicated in the details; Harbour also distinguishes more noun classes.

In this section, we found instances of noun classes with inherent number, combined with the possibility of expressing all 'unexpected' numbers (the opposites of inherent numbers) with one and the same morpheme; this establishes diagonal syncretism, and full or partial polarity is not excluded. But that does not raise any problem to the learner who memorizes to which class a noun belongs in terms of its inherent number, which, moreover, is prototypically supported by semantic properties of the denoted objects.

In the next section, we see a similar phenomenon, in which another inherent property of nouns (namely gender) interacts with the way in which number is marked on the surface. Assuming that plural morphemes may have originated from former nouns it is not surprising that they themselves can bear gender. This, then, enables the speaker/hearers to overcome the apparent polarity.

5.5 Apparent polarity in the number–gender interaction of Somali

Somali nouns often switch the gender in the plural (cf. Albright and Fuß this volume:§7.3.1). Evidence comes from the choice of the definite article, which is /ka/ in the masculine, and /ta/ in the feminine (each with phonologically conditioned variants): masculine nouns often take the feminine article in the plural, while feminine nouns often take the masculine article in the plural (42).

(42) Number–gender polarity in Somali (Cushitic)

	–fem	+fem
–plural	ínan-ka (m) ‘the son’	inán-ta (f) ‘the daughter’
+plural	inam-má-da (f) ‘the sons’	inam-á-ha (m) ‘the daughters’

According to the Somali noun class system described by Saeed (1993), *inan* ‘son’ belongs to class2, taking /Cá/ as plural morpheme (where C is a copy of the final consonant of the base, and /á/ becomes [ó] in final position), while *inán* ‘daughter’ belongs to class1, taking /-á/ as plural morpheme (which becomes [-ó] in final position). These different plural morphemes attribute their own gender value, just like German diminutive *-chen*, which assigns neuter, regardless of whether it combines with a masculine or a feminine noun (*das Söhnchen* ‘the little son’ vs. *das Töchterchen* ‘the little daughter’). Of course, the gender of plural forms is no longer motivated by sex. It is a purely formal category, just like gender with inanimates, which lack any sex distinction.

Saeed (1999), and, following him, Lahne (2007), reduced the number–gender polarity found in (42) to the statement that the Somali article itself shows polarity.

(43) Somali definite article

	–fem	+fem
–plural	-ka	-ta
+plural	-ta	-ka

However, (43) makes the wrong generalization. Somali has various plural morphemes; each one determines individually whether it takes /-ta/ or /-ka/ as the respective form of the definite article. With some plural morphemes (those in class3 and class4), there is no reversal in the plural. (44) lists all plural morphemes together with the gender (and the corresponding form of the article) they select, as well as the gender (plus article) they determine (Lecarme 2002). Note that class1 and class3 have the same plural morpheme (m). The nouns that can be combined with that morpheme can be feminine (class1) or masculine (class3). The reduplicating morphemes in class2 and class4 are only minimally distinct. The vowel in class2 is always final, while in class4 it is internal. Although both morphemes select masculines, their output is feminine in class2, but masculine in class4.¹⁰ Somali is a language with tonal accent: singular and plural of class5 only differ in the accent position. Lecarme (2002) describes the plural exponent of this class as a zero suffix. Actually it is a suffix that contributes high tone. The more complex plural forms of class6 and class7 attach to stems ending in a vowel, mostly derived stems.

¹⁰ Could classes 3 and 4 be seen as the exceptions to a more general reversal pattern? It is unlikely that just one of the two input classes of /-ó/ and just one of the two reduplication patterns are exceptions in the same direction, namely that both input and output are masculine. Moreover, note that there is additional evidence for Lecarme’s claim.

(44) Somali plural classes

noun class: plural morpheme	singular			plural			gloss
class1: -á	náag	-ta	f	naag-ó	-ka	m	'woman'
	fár	-ta	f	far-ó	-ka	m	'finger'
class3: -á	waláal	-ka	m	walaal-ó	-ka	m	'brother'
	ílig	-ka	m	ilk-ó	-ka	m	'tooth'
class2: -Cá	ínan	-ka	m	inam-mó	-ta	f	'son'
	dagáal	-ka	m	dagaal-ló	-ta	f	'war'
class4: -áC	nín	-ka	m	nim-án	-ka	m	'man'
	af	-ka	m	af-áf	-ka	m	'mouth'
class5: accent shift	díbi	-ka	m	dibí	-ta	f	'bull'
	mádax	-ka	m	madáx	-ta	f	'head'
class6: -óyin	hóoyo	-ta	f	hooyo-óyin	-ka	m	'mother'
	magaaló	-ta	f	magaalo-óyin	-ka	m	'town'
class7: -yaál	áabbe	-ka	m	aaba-yaál	-ta	f	'father'
	maroodí	-ka	m	maroodi-yaál	-ta	f	'elephant'

Some nouns have more than one plural form, possibly differing in formal gender: for instance, *dáas* 'shop' has the plural forms *daas-ás* (class4) and *daas-yó* (class2).

On the basis of the observation that in Somali the plural instantiates its own gender, Lecarme (2002) argues that it is derivational. This conclusion is supported by further data. Plural forms can be embedded into derivational complexes such as compounds (45a); plural can be iterated (45b); plurals of plurals often identify countable groups, or have intensive meaning.

- (45) a. buug-ag-hay-é 'librarian' (lit. 'books-keeper')
 book-PL-keep-AG.NML
- b. nín (m) 'man'
 nim-án (m) 'men'
 nim-an-yaál (f) '(groups of) men' or
 nim-an-yów (m) '(groups of) men'

Note that the double-plural word *nim-an-yów* does not shift gender at any stage in the derivation; so the generalization in (43) is clearly wrong. Actually, number–gender polarity exists purely as a surface phenomenon in some classes of the vocabulary, and in no way enters the representation. One might ask why it exists at all. The answer would have to go back into the history of the Cushitic, and probably also the Afroasiatic languages in general, where gender plays a major role.

5.6 Partial polarity in ablaut patterns

In this section I consider three instances of ablaut reversal that can be handled similarly: ablaut in the perfective vs. imperfective forms of Classical Arabic (cf. de Lacy this volume: § 4.4.2), theme vowel ablaut in the subjunctive vs. indicative forms of Spanish (similarly in other Romance languages), and theme vowel ablaut in the so-called stem-partitive plural vs. partitive singular in Estonian.

5.6.1 Ablaut in Classical Arabic verbs

Ablaut is a well-known phenomenon of Classical Arabic. Worrell (1925) claimed that broken plurals follow the principle of polarity (consider *SaaHib* ‘friend’ → *SiHaab* ‘friends’). This position was rejected by Speiser (1938), mainly on the basis that there are many-to-many relationships: various singular forms are mapped to the same plural form (e.g. *qatl*, *qatiil*, *qaatil* → *qitaal_{pl}*), and one singular form can have many plural forms (see also McCarthy and Prince 1990a, Ratcliffe 1998). Another domain in which ablaut is found is the realization of aspect and voice on the verb. (46) gives examples where the second vowel shifts from perfective to imperfective, illustrating also partial polarity (a → i, i → a).

(46) Perfective vs. imperfective forms in Classical Arabic (3msg active)

	root	perfective	imperfective	vowel shift
a.	Drb ‘hit’	Darab-a	ya-Drib-u	a → i
b.	lbs ‘dress’	labis-a	ya-lbas-u	i → a
c.	ktb ‘write’	katab-a	ya-ktub-u	a → u
d.	kbr ‘become great’	kabur-a	ya-kbur-u	u → u

Guerssel and Lowenstamm (1996) try to avoid this particular reversal, and argued that the second vowel of *Darab* is underlyingly \emptyset (hence, $\emptyset \rightarrow i$). Furthermore, they postulated an ablaut path that leads us from one vowel to the next: $\emptyset \rightarrow i \rightarrow a \rightarrow u \rightarrow u$; they also added some evidence that such a path might be universally valid.

Teeple (2007) denies some of Guerssel and Lowenstamm’s assumptions: (i) $u \rightarrow u$ cannot be part of the ablaut rule because /u/ is an inchoative morpheme, which must not be changed. (ii) He argues that imperfective (and not perfective) is basic: there are then fewer vowels in the output than in the input, and opacity (a → i, a → u) is avoided. (Moreover, imperfective forms have a more widespread distribution, and allow for

various nominal and verbal derivations; see Benmamoun 2003). Teeple, therefore, rightly bases his account on the three reversed patterns $a \rightarrow i$, $i \rightarrow a$, $u \rightarrow a$ (involving partial polarity).

Bearing in mind that Classical Arabic has three vowels (47), one can easily see what happens: the output vowel is always [-round], and both /a/ and /i/ shift their [back] and [high] values, while /u/ shifts its [round] and [high] values. So it is the [high] value that *must* be shifted.

(47) Classical Arabic vowels

	round	back	high
a	-	+	-
i	-	-	+
u	+	+	+

Teeple (2007) assumes CONTRAST(prf) as the constraint that triggers vowel shift, while a sequence of IDENT constraints regulates the feature values that have to remain (48a). CONTRAST says that there has to be a difference but does not specify what the difference has to be. A simpler (and more specific) way of doing the work is to model the contrast by a non-identity-constraint: if the fact that the [high] value must be shifted is expressed by means of \neg IDENT(high), one only has to add that the [round] value must not be shifted (48b). This explains automatically why the reversed patterns $a \rightarrow i$ and $i \rightarrow a$ appear. IDENT(round) is violated only with /u/ in the input. Having in mind that constraints go hand in hand with the specification of exponents, a further alternative is to specify the resulting vowel in addition to the non-identity requirement (48c).

(48) Realize perfective in Classical Arabic

- CONTRAST(prf) » IDENT(round) » IDENT(back) » IDENT(high) (Teeple 2007)
- \neg IDENT(high) » IDENT(round)
- $+prf \leftrightarrow \{-round\}, \neg IDENT(high)$

The dominating constraints in (48a,b) implement *anti-faithfulness* in the sense of Horwood (2001) and Alderete (1999, 2001) (see also de Lacy this volume for discussion). CONTRAST(prf) is violated if the perfective stem is identical to the imperfective stem (the input), while \neg IDENT(high) is violated if vocalic height is not shifted. It is therefore more restrictive. (Of course, other segmental material than the vowel shouldn't be shifted.) The working of the constraint rankings is illustrated in (49) and (50).

(49) *ktab* 'write (prf)', *msak* 'hold (prf)', *Srib* 'drink (prf)' (Teeple 2007)

Input: /ktub/ (+[prf])	CONTR(prf)	IDENT(round)	IDENT(back)	IDENT(high)
ا. <i>ktab</i>		*		*
b. <i>ktib</i>		*	*!	
c. <i>ktub</i>	*!			

Input: /msik/ (+[prf])	CONTR(prf)	IDENT(round)	IDENT(back)	IDENT(high)
☞ a. msak				*
b. msik	*!			
c. msuk		*!	*	

Input: /Srab/ (+[prf])	CONTR(prf)	IDENT(round)	IDENT(back)	IDENT(high)
a. Srab	*!			
☞ b. Srib			*	*
c. Srub		*!		*

(50) A simpler description

Input: /ktub/ (+[prf])	¬IDENT(high)	IDENT(round)
☞ a. ktab		*
b. ktib	*!	*
c. ktub	*!	

Input: /msik/ (+[prf])	¬IDENT(high)	IDENT(round)
☞ a. msak		
b. msik	*!	
c. msuk	*!	*

Input: /Srab/ (+[prf])	¬IDENT(high)	IDENT(round)
a. Srab	*!	
☞ b. Srib		
c. Srub		*!

All three accounts given in (48) are successful. Both Teeple's analysis (48a) and the variant in (48b) are amorphous: no morpheme is involved, instead, a specific cophonology (a particular constraint ranking) is assumed to characterize the Arabic perfective. Because ¬IDENT(high) is a specific instantiation of CONTRAST, it should be preferred here. By contrast, the variant in (48c) assumes the existence of morphemes (including those that add only a phonological feature to a base form), which possibly are coupled with certain constraints functioning as their cophonology. From

the more general perspective that ‘affixes’ are the placeholder for recurrent ‘shifts and restrictions’ expressing certain meanings, alternative (48c) is optimal.

5.6.2 Spanish subjunctive

Like in other Romance languages, Spanish subjunctive shifts the theme vowel: the low vowel /a/ (occurring in the infinitive and in five forms of the present indicative) becomes /e/, while the non-low vowels /e/ and /i/ become /a/. This can be seen in (51).

(51) Theme vowel reversal in Spanish

	hablar ‘talk’	temer ‘fear’	vivir ‘live’
prs.ind	hablo hablamos	temo tememos	vivo vivimos
	hablas habláis	temes teméis	vives vivís
	habla hablan	teme temen	vive viven
prs.sbjv	hable hable	tema tema	viva viva
	hables habléis	temas temáis	vivas viváis
	hable hablen	tema teman	viva vivan

This theme vowel shift is summarized in (52), which more precisely shows that the reversal (polarity) only involves class1 and class2, so it is partial polarity.

(52) Spanish theme vowel summarized

	class1	class2	class3
ind	a	e	i
sbjv	e	a	a

One way of characterizing this asymmetry is by means of explicit entries:

- (53) /e/ ↔ sbjv / a_
/a/ ↔ sbjv

In any case, the subjunctive vowel belongs to the class {e, a}, which is [–round, –high]. The contrast between indicative and subjunctive theme vowel involves the third vocalic feature of Spanish, namely [low]. For convenience, we assume the vowel specification in (54).

(54) Spanish vowels

	round	low	high
a	-	+	-
e	-	-	-
i	-	-	+
o	+	-	-
u	+	-	+

There are two alternative ways to express that the contrast only involves the feature [low], while the values of [round] and [high] (mostly) remain identical: (a) by means of a constraint ranking, or (b) by means of a specification of the subjunctive vowel together with a specific contrast requirement. Again, there is no substantial difference between these alternatives; they only differ conceptually.

(55) Realize subjunctive in Spanish:

- a. $\neg\text{IDENT}(\text{low}) \gg \text{IDENT}(\text{high}), \text{IDENT}(\text{round})$ (Trommer 2008d)
 b. $+\text{sbjv} \leftrightarrow \{[-\text{round}, -\text{high}], \neg\text{IDENT}(\text{low})\}$

5.6.3 Estonian stem-partitive plural

The partial polarity occurring in the Estonian partitive has been noted by Baerman (2007), citing Blevins (2006). Besides a partitive plural expressed by a suffix, Estonian also has a partitive plural stem, expressed by a theme vowel shift on the basis of the respective singular form. (56) shows the existing theme vowel shifts.

(56) Estonian stem-partitive plural ablaut

sg	pl		shift
kukk-e	kukk-i	'rooster'	e → i
kool-i	kool-e	'school'	i → e
lukk-u	lukk-e	'lock'	u → e
pes-a	pes-i	'nest'	a → i

Two generalizations emerge from this table:

- (i) The PART.pl theme vowel belongs to the class {e, i}.
 (ii) High vowels are mapped to /e/, while non-high vowels are mapped to /i/.

Estonian has nine vowels, so it becomes more complex to see which features remain identical and which are shifted. Let us assume the features in (57).

(57) Estonian vowels

	round	low	high	back
a	-	+	-	+
e	-	-	-	-
i	-	-	+	-
o	+	-	-	+
u	+	-	+	+
æ	-	+	-	-
ø	+	-	-	-
ɣ	+	-	+	-
ɤ	-	-	-	+

It seems that the actual vowel shift cannot fully be captured by IDENT and \neg IDENT constraints. Thus, for empirical reasons it is more adequate to specify the result in terms of what is required and what is contrasted against the base, than in terms of an IDENT-constraint ranking.

(58) Realize stem-partitive plural in Estonian

$\text{PART,+pl} \leftrightarrow \{[-\text{round}, -\text{low}, -\text{back}], \neg\text{IDENT}(\text{high})\}$

Again, the partial polarity effect observed for Estonian falls out from the specification of the stem-partitive plural vowel together with a specific contrast requirement. That means that polarity (reversal) is a surface effect accidentally arising under certain circumstances.

The three instances of ablaut considered in this section turn out to be very similar, as (59) shows. All output vowels are $[-\text{round}]$, moreover, all of them are characterized by minus-values. The contrast is always between different heights. This observation suggests that morphemic vowel variation is subject to certain natural tendencies, but needless to say that this issue needs more investigation.

(59) Vowel shift in three unrelated languages

- Arabic: $+\text{prf} \leftrightarrow \{[-\text{round}], \neg\text{IDENT}(\text{high})\} \rightarrow \{a, i\}$
- Spanish: $+\text{sbjv} \leftrightarrow \{[-\text{round}, -\text{high}], \neg\text{IDENT}(\text{low})\} \rightarrow \{a, e\}$
- Estonian: $\text{PART,+pl} \leftrightarrow \{[-\text{round}, -\text{low}, -\text{back}], \neg\text{IDENT}(\text{high})\} \rightarrow \{e, i\}$

5.7 Mark contrast: polarity in the Old French declension

A clear polarity effect is found in Old French masculine nouns resulting from Latin o-stems (class II nouns in Bauer and Slocum 2007). In Old French, most case endings

of Latin were reduced, and /-s/ became the only inflectional marker. Only a single case contrast remained, that between objective and nominative. As (60) demonstrates, both NOM.sg /-us/ and ACC.pl /-os/ of Latin o-stems shifted to /-s/, so that the polarity effect arose accidentally.

- (60) The development of class II nouns (masculines) in Old French (*mur* ‘wall’)

<i>Latin</i>	sg	pl		<i>OF II</i>	sg	pl
NOM	mur- us	mur- i	<	NOM	mur- s	mur
ACC	mur- um	mur- os	<	OBJ	mur	mur- s

By contrast, Old French feminine nouns (class I), resulting from Latin a-stems, do not show polarity because Latin a-stems do not have any ending with /-s/ in the singular. Moreover, /-s/ of ACC.pl extended to all plural forms, so that case contrasts were leveled altogether.

- (61) The development of class I nouns (feminines) in Old French (*fame* ‘women’)

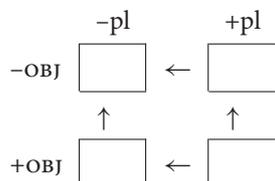
<i>Latin</i>	sg	pl		<i>OF I</i>	sg	pl
NOM	-a	-ae	<	NOM	fame	fame-s
ACC	-am	-as	<	OBJ	fame	fame-s

One can describe the resulting noun inflection of Old French by a few constraints, all high-ranked in the case of masculines:

- (62) CONTRAST(case). The individual forms of a noun contrast in case (OBJ vs. NOM).
 CONTRAST(number). The individual forms of a noun contrast in number (pl vs. sg).
 MARK(maxF). Every combination of plus-valued features is overtly marked.

If only /-s/ is available as affix, the combined effect of these three constraints guarantees that the polarity pattern shown in (60) becomes optimal. However, if CONTRAST(case) is taken to be irrelevant (for instance, by deleting the feature +OBJ for feminines), the pattern shown in (61) becomes optimal. Note that three assumptions are necessary to arrive at this result: (i) /-s/ is associated with a domain of features, <OBJ,pl>, so that each logically possible combination of feature values can be chosen; (ii) cells of the paradigm are pairwise compared to determine whether their contents contrast with each other; (iii) paradigm construction is recursive along the possible paths in the lattice formed by the feature values. For example in (63), only cells directly connected by an arrow are compared with each other, so that no direct comparison between the [-OBJ,-pl] and [+OBJ,+pl] cells is possible; the construction must start with the latter cell (see also Wunderlich 1996).

(63) Recursive paradigm construction



This predicts that full reversal can only arise accidentally, while diagonal syncretism (comparison with the same base, namely the [+OBJ,+pl] form) can be systematic.

There is nothing strange with paradigm construction based on pairwise contrast. In the case of a richer vocabulary those contrasts are exploited to determine the affix entries, while here they are exploited to determine the entry of the cells directly. This framework, which is fully local, crucially differs from global paradigm optimization in the sense of McCarthy (2005).

In view of the Old French polarity data in (60), Lahne (2007) proposed a slightly different account, based on the principles in (64).

- (64) a. DISCRETENESS OF ENVIRONMENT. Adjacent cells must be discretely marked.
 b. MINIMALITY.
 c. If the association of a marker M_1 with a matching morphological environment $[\alpha]$ violated a principle P, then insert a marker M_2 that meets P iff the feature specification of M_2 is minimally distinct from that of M_1 .

Lahne then constructs the full paradigm cell by cell. If /-s/ is first associated with [+OBJ,+pl], then the two adjacent cells ([+OBJ,-pl] and [-OBJ,+pl]) must be associated with \emptyset because of DISCRETENESS, and, for the same reason, [-OBJ,-pl] must again be associated with /-s/.

However, this account is too general and faces problems in light of further data. Consider the so-called ‘hybrid’ nouns of Old French: class Ia includes all feminines not ending in /-e/, such as *flor* ‘flower’ in (65a), and class IIa includes all masculines ending in /-e/, such as *pere* ‘father’ in (65b). In class Ia, /-s/ is extended to NOM.sg (thus making the feminine inflection more similar to masculine). By contrast, in class IIa, /-s/ becomes optional in NOM.sg (thus making the masculine inflection more similar to the feminine).

(65) ‘Hybrid’ nouns in Old French

a.	Ia (f)	sg	pl	b.	IIa (m)	sg	pl
	NOM	flor-s	flor-s		NOM	pere(s)	pere
	OBJ	flor	flor-s		OBJ	pere	pere-s

Moreover, the masculine forms of adjectives ending in *-re* (such as *povre* ‘poor’) show the same distribution as that found optionally for IIa nouns (66a). Bauer and

Slocum (2007) also mention that in late Old French, masculines ending in *-re* (such as *livre*, ‘book’) become similar to the Ia-class of feminines (66b).

(66) Old French masculine adjectives and nouns ending in *-re*

a.	Adj	sg	pl	b.	Ia (m)	sg	pl
	NOM	povre	povre		NOM	livre-s	livre-s
	OBJ	povre	povre-s		OBJ	livre	livre-s

Now, all the patterns shown in (65) and (66) violate Lahne’s principle of DISCRETE-NESS, and it is not apparent which global principle could be substituted for it in order to derive the observed distributions. What the additional patterns shown in (65) and (66) have in common is that the number distinction disappears in the nominative. (The same happens with the masculine definite article *li*; see (71) below.)

In (67), the four attested distributions of */-s/* are summarized in A to D.

(67) Distribution of */-s/* in Old French nouns and adjectives

A(m)		-pl	+pl	B(f)	-pl	+pl	C(m)	-pl	+pl	D(f,m)	-pl	+pl
	-OBJ	-s	∅		∅	-s		∅	∅		-s	-s
	+OBJ	∅	-s		∅	-s		∅	-s		∅	-s

In a first attempt, one could specify the entry of */-s/* (or that of ∅) under the four different conditions, letting the respective other form to be the elsewhere form. If one postulates that the elsewhere form should cover the least specified cell (i.e. [-OBJ, -pl]), */-s/* would be the elsewhere affix in A and D, but ∅ in B and C. If one instead postulates that the elsewhere form should be the form that occupies most of the cells, */-s/* would be a clear candidate in D, but ∅ in C. None of these solutions seems reasonable. So let us, instead, look at what is common to all noun and adjective classes, namely the specification in the objective case:

(68) First account: Lexical entries

/-s/ ↔ [+OBJ, +pl]

∅ ↔ [+OBJ]

Assuming now that the two CONTRAST constraints in (62) can be relativized to a particular case or a particular number as context, each of the individual lexical classes in (67) can be characterized by just one CONTRAST requirement (see (69)), where the contrast holds against the two objective forms specified in (68).¹¹ However, one has to tolerate that the given specification can be violated, that is, CONTRAST must dominate MAX(F)/affix, which requires the affix information to be unchanged.

¹¹ Interestingly, each vocabulary class can be characterized by a certain constraint ranking determining its inflection, which is reminiscent of the concept of cophonologies specific for classes of vocabulary items (Inkelas and Zoll 2005). But, differently from cophonologies, the phenomenon of *s*-distribution in Old French is purely morphologically conditioned.

(69) First account: CONTRAST dominates what the lexical entries require

- A: CONTR(case) » MAX(F)/affix class II (m)
 B: CONTR(number) » MAX(F)/affix class I (f)
 C: CONTR(case)/+pl » MAX(F)/affix class IIa (m) or masc. adjectives
 D: CONTR(case)/-pl » MAX(F)/affix class Ia (f)

For instance, CONTR(case)/+pl means in the presence of (68) that NOM.pl must be \emptyset -marked in C in order to fulfill the contrast requirement, while in the absence of such a requirement for the singular, 'no contrast' becomes the default, and NOM.sg is \emptyset -marked as well.¹²

What is problematic in this account is the fact that affix information can be changed. Therefore the alternative in (70) is advanced, based on the principles of recursive paradigm construction, outlined above: /-s/ is the affix that spans the paradigm <OBJ,pl>, and, therefore, must include the specification [maxF]; no zero-affix is assumed, but additional CONTRAST constraints are necessary.

(70) Second account: Recursive paradigm construction

- a. In the domain $F = \langle \text{OBJ}, \text{pl} \rangle$, [maxF] \rightarrow /-s/.
- b. A: CONTR(case), CONTR(number) class II (m)
 B: CONTR(number) class I (f)
 C: CONTR(case)/+pl, CONTR(number)/+OBJ class IIa (m) or masc. adjectives
 D: CONTR(case)/-pl, CONTR(number)/+OBJ class Ia (f)

This account is more adequate, and also more transparent than that in (68) plus (69). The variation in the paradigms A to D is exclusively characterized by two sets of constraints. The polarity effect in the masculine class II nouns (=A) now falls out from the combined force of the specification in (70a) and the two CONTRAST constraints regarding case and number. Note that this account is in the spirit of Lahne's approach in that it avoids the assumption of paradigm optimization. Rather, it works locally, step by step.

To illustrate the analysis, let us see how the curious paradigm D is derived. First, /-s/ occupies the cell [+OBJ,+pl]. Then, \emptyset is better than /-s/ in [+OBJ,-pl] because the latter violates CONTR (number), but /-s/ is better than \emptyset in [-OBJ,+pl] because no CONTR(case) is required in +pl. Finally, /-s/ in [-OBJ,-pl] satisfies both CONTR(case) in -pl and no CONTR(number) in -OBJ compared with the neighboring cells.

The account of nominal inflection in Old French can easily be extended to the forms of the definite article, with which nouns are combined. The article forms again show certain syncretism, in particular, /les/ occurs in both masculines and feminines, but has different extensions. One could state that /les/ is ambiguous between

¹² If no contrast is required, then indeed \neg CONTRAST, i.e. identity, is required.

[+OBJ,+pl,-fem] and [+pl,+fem]. A more simple description is available if /les/ is unspecified for gender, and assumed to span the paradigm <OBJ,pl> like before. Here, then, CONTRAST works hand in hand with a richer inventory, see (71c,d).

(71) Old French definite article

a. Masc.	<table style="border-collapse: collapse; text-align: center;"> <tr> <td style="border: none;"></td> <td style="border: none;">sg</td> <td style="border: none;">pl</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px 5px;">NOM</td> <td colspan="2" style="border: 1px solid black; padding: 2px 5px;">li</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px 5px;">OBJ</td> <td style="border: 1px solid black; padding: 2px 5px;">le</td> <td style="border: 1px solid black; padding: 2px 5px;">les</td> </tr> </table>		sg	pl	NOM	li		OBJ	le	les
	sg	pl								
NOM	li									
OBJ	le	les								

b. Fem.	<table style="border-collapse: collapse; text-align: center;"> <tr> <td style="border: none;"></td> <td style="border: none;">sg</td> <td style="border: none;">pl</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px 5px;">NOM</td> <td style="border: 1px solid black; padding: 2px 5px;">la</td> <td style="border: 1px solid black; padding: 2px 5px;">les</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px 5px;">OBJ</td> <td style="border: 1px solid black; padding: 2px 5px;"></td> <td style="border: 1px solid black; padding: 2px 5px;"></td> </tr> </table>		sg	pl	NOM	la	les	OBJ		
	sg	pl								
NOM	la	les								
OBJ										

c. Constraints:

CONTR(number)/+fem

CONTR(case)/-fem

d. Inventory:

In the domain $F = \langle \text{OBJ,pl} \rangle$, $[\text{max}F] \rightarrow /les/$.

/la/ \leftrightarrow [+fem]

/le/ \leftrightarrow [+OBJ]

/li/ \leftrightarrow elsewhere

In (10) above, an impossible paradigm was hypothesized. The reader will have realized that (60), illustrating the inflection of masculine (class II) nouns of Old French, is an instance very near to such an ‘impossible paradigm’: the reversal affix /-s/ applies to one and the same stems, and there is no indication of inherent marking of one of the categories (number, case). So, why is it possible that learners of Old French did not become confused? A probable solution depends on two facts: (i) there were no other affixes to be learned in noun inflection; (ii) the only way of distinguishing vocabulary classes formally was the distribution of that particular affix within inflection. The polarity observed for Old French was not only an accidental historical development, but was also embedded into a lexically determined variation of number–case marking. From a more general perspective, Old French was learnable because it allowed the distinction of two categories with minimal expense; nearly everything was done by contrast operations rather than by affixation.

However, as a reviewer noted, this raises the question of why related inflectional systems seem to be quite rare cross-linguistically. One point is that noun inflection of Old French is a transitory system, and such systems generally are not so often observed. In order to show that kind of special contrast-related behavior, the number of interacting dimensions must be small, probably just two. Moreover, the polarity effect only arises, and is preserved for a certain time, in one of four different paradigms, as shown in (67). Perhaps most important is the fact that the Old French system nearly lacks affixes. It might be that a purely local operation on strings such as affixation is more natural than contrasting, an operation that at least needs pairs of strings.

5.8 Conclusion

This chapter has tried to classify the known examples of polarity (in particular, reversal) cited in the literature according to their place within morphology. Overwhelmingly, polarity is constituted by the comparison of inflectional classes, which is exactly what Hetzron (1967) had already stated (as cited in my “Introduction”). There might be good reasons for comparing inflectional classes, or for bringing them together in larger paradigms, and when doing so, one certainly needs some structuring concepts. Since the notion of polarity was especially alive in the study of Afroasiatic languages (including Semitic), it was used there as a genuine principle in the study of morphology, but one which Speiser (1938) found “linguistically obscure”. This reaction might seem to us a little too coarse. The principle of polarity is not so much obscure, as it is nearly absent from morphology. At least, there are only very few phenomena that can motivate the assumption of such a principle. To that extent, Speiser was right.

In considering the individual phenomena, I mostly came to the conclusion that they can best be analyzed without any direct recourse to polarity. Instead, alternative descriptions which seem to be both economical and empirically adequate are able to predict that, under certain circumstances, polarity appears. The conclusion is: there is no motivation for polarity as an independent concept.

This does not mean that the study of polarity phenomena is totally useless. On the contrary, a closer look into a minimal inflectional system such as that provided by Old French, working with only one suffix, shows us that morphology is not condemned to a set of affixes, but essentially makes use of the very simple principle of CONTRAST (which is simpler than polarity). Indeed, all the more interesting phenomena of polarity can best be described by certain implementations of CONTRAST. If one wants to say that something which is underlyingly imperfect becomes perfect, one needs a principle to point out that difference. Mostly, certain affixes are found that mark perfect (and therefore receive preference according to SPECIFICITY), but sometimes only very small differences such as ablaut are observed, and here, NON-IDENTITY(F), referring to a specific vocalic feature F in the input, is a suitable means of instantiating CONTRAST. Polarity is too complex a concept to be usefully considered as a basic principle.

The only true reversal I found in this overview is between inherent and morphologically induced number features, characteristic for three unrelated languages (see section 5.4). This notion of reversal logically follows if we assume that X is naturally classified as A, but that it is nevertheless possible that X appears as non-A and then needs to be marked. In the languages discussed, what is classified as A can become non-A, and what is classified as non-A can become A. In this sense, the task of morphology is to mark what is unexpected. If perfective aspect is expected in a specific context, then the morphology has to mark every instance in which imperfective occurs instead. If singular is expected, plural needs to be marked, and if plural is expected, singular needs to be marked. In this regard, it is not surprising to find examples in which morphological reversal is observed.