

and 2pl are both pronounced *legt* cannot be reduced to a general lack of 2nd/3rd or singular/plural distinctions in the language, but instead appear to be contextually restricted: the 1st person and 3rd person are identical only in the plural, and 3sg and 2pl are identical only in the present tense of regular verbs. (Further details of the relation between person marking and tense will be discussed in section 7.2 below).

The proper theoretical response to such identities is not always obvious. At one extreme, one may be tempted to dismiss them as coincidental—a not wholly implausible response, given that homophony is pervasive in language. (An arguably different *-er* suffix is also used for noun plurals and as a linking element in compounds, while another suffix *-t* is used to mark past tense in regular verbs.) At the other extreme, one may seek to minimize accidental homophony by reducing as many phonological identities as possible to morphological identity (Müller 2006b, c). It is almost certainly the case that some instances of syncretism reflect accidental homophony, while others reflect identity at a deeper morphological level. In this chapter, we survey the sources of evidence that are relevant in determining whether a given instance of syncretism is morphologically significant, along with a set of theoretical mechanisms that have been proposed to analyze true (non-accidental) cases of syncretism. We then illustrate the strengths and weaknesses of these mechanisms in section 7.2 with in-depth discussions of several cases of syncretism.

It is important to note from the outset that we use the term 'syncretism' to refer to any case of identity between forms that realize distinct morphosyntactic feature combinations. This includes whole-word syncretism, such as the case of German 1pl/3pl *legen* or 3sg/2pl *legt*. It also includes partial syncretism, where two forms share a suffix or root allomorph but are not wholly identical. For example, the German verb *tragen* 'carry' has a distinct root allomorph *träge-* in the 2sg and 3sg. As a result, the 3sg (*träge-t*) shares the same form of the root as the 2sg (*träge-st*) and the same suffix as the 2pl (*träge-t*), but is distinct from both at the level of the entire word. Although the term syncretism is sometimes reserved to refer to identity of entire inflected forms (e.g. Baerman, Brown, and Corbett 2005: 7–9), we use it to refer equally to identity at the level of entire words or of individual morphemes. Most of the theoretical mechanisms we consider below concern approaches to deriving the distribution of individual morphemes, and the distinction between whole-word and partial syncretism is of no particular theoretical relevance in a morpheme-based framework.

In addition, it is worth noting that although the discussion below relies on detailed consideration of a small set of cases selected for the amount of supporting morphological and syntactic evidence that they provide, the mechanisms we discuss must also be confronted with a full range of typological evidence, including data from languages that make very different morphological distinctions. An extremely valuable resource in this pursuit is the Surrey Syncretisms Database,<sup>2</sup> and a detailed description of the major trends that can be observed is found in Baerman et al. (2005). In section 7.3, we present a selection of relevant phenomena, focusing on morphological polarity effects, instances of directional syncretism, and the relationship between syncretism and portmanteau expression.

<sup>2</sup> <http://www.smg.surrey.ac.uk/>

## Syncretism

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### 7.1 Introduction

One of the most basic tasks of morphological analysis is to account for patterns of SYNCRETISM—that is, cases in which the same phonological string is used to express distinct combinations of morphological features. For example, although in principle languages may distinguish between at least three numbers (singular, dual, plural) and three persons (1st, 2nd, 3rd), most German verbs show only four distinct surface present tense forms to mark nine logically possible combinations, as shown in Table 7.1 for the regular verb *legen* 'put':<sup>1</sup>

The forms in Table 7.1 illustrate two different ways in which morphological distinctions may fail to be realized. On the one hand, dual forms are always identical to plural forms in German, not just in the present tense paradigm of regular verbs, but for every verb class in every tense and mood. In this case, there is no evidence that the dual/plural distinction is morphologically active in German, a fact that we might plausibly wish to express by eliminating the morphosyntactic feature(s) for dual from German morphological representations at some very deep (possibly syntactic) level. On the other hand, the fact that the 1pl and 3pl are identical (*legen*) cannot be reduced to a lack of distinctions between first and third person forms, since a distinction is clearly evident in the singular (1sg *lege* vs. 3sg *legt*). Likewise, the fact that the 3sg

TABLE 7.1. Syncretism in German present tense verb inflection

	SINGULAR	DUAL	PLURAL
1ST	leg-e	leg-en	leg-en
2ND	leg-st	leg-t	leg-t
3RD	leg-t	leg-en	leg-en

<sup>1</sup> Here, and throughout this chapter, we delimit our attention to instances of inflectional syncretism affecting elements that are paradigmatically related, that is, identical phonological realizations of two (or more) distinct morphosyntactic feature complexes that share a lexical root and a (possibly null) subset of feature values and are thus—in traditional terms—part of the same paradigm.

Another test case for theoretical approaches to syncretism comes from the inspection of patterns of language change. Relevant diachronic evidence is discussed in section 7.4, where we review a set of cross-linguistically recurring tendencies in the historical development of inflectional paradigms. Based on a detailed discussion of two case studies—the loss of stem alternations in Germanic and the rise of so-called *Einhelfplural* ‘common plural’ in the verbal agreement paradigm of Alemannic—we investigate whether the relevant historical developments can be attributed to the workings of learning strategies that shape the acquisition of inflectional morphology.

The possibility that some instances of identity arise through accidental homophony has long been recognized in the literature (Williams 1981, Carstairs 1987, and many others). In many cases, it seems quite plausible to suppose that the identity relation between two morphemes is purely phonological—a fact may be less coincidental for affixes than for roots due to the greater phonological restrictions that affixes frequently obey (Beckman 1998, Alderete 1999, 2003, and others). For example, inflectional affixes in German are nearly all coronal consonants: in addition to 3sg/2pl *-t*, the affix *-(e)st* is used for 2sg and for superlatives; *-(e)n* is used for 1pl, 3pl, infinitive, some noun plurals, and many oblique case endings in nouns and adjectives; *-er* is used for comparatives and some noun plurals; and so on.<sup>3</sup> Analyses of German typically do not treat it as a significant fact that the 1pl is identical to the infinitive (e.g. *legen* ‘to put’ or ‘we put’), since the recurrence of *-en* in final stressless syllables may also be attributed to phonological pressures. This is seen also in the fact that final syllables have generally reduced to *-en* over time; see section 7.4 below. It is therefore important to ask whether there is evidence that the identity of the 1pl and 3pl is of any greater significance than the identity between 1pl and infinitive, or noun plurals in *-en*. We can discern several arguments in the literature for treating at least some instances of syncretism as linguistically significant, including distributional evidence from within the morphological system, syntactic evidence concerning feature compatibility, and ‘external’ evidence from psycholinguistic experiments and language change (for the latter, see section 7.4).

### 7.1.1 Morphology-internal evidence

An importance source of evidence that the connection between the 1pl and 3pl in German is linguistically significant comes from the fact that these two forms are always identical, even when they are not marked with the suffix *-en*. For example, the verb *sein* ‘to be’ is suppletive in most present tense forms, and is *sind* in both the 1pl and 3pl (distinct from the infinitive). This suggests that identity between these forms is not just a coincidental sharing of *-en*, but rather reflects a deeper fact about the language (Williams 1981: 266–9, Carstairs 1987: 94). This situation, in which the same identity is seen across multiple inflectional classes regardless of the individual morphemes involved, is sometimes referred to as metasyntactic (see also Carstairs 1987, Bobaljik 2002, Frampton 2002, Harley 2008).

<sup>3</sup> An exception is the suffix *-em*, used for ‘strong’ adjective agreement in the masculine and neuter dative singular.

Metasyntactic facts that hold across all inflectional classes are a powerful source of evidence that we are observing something more systematic than a coincidental surface identity. A frequently discussed example comes from Latin (Williams 1981, 1994), in which the dative and ablative plural are identical in all inflectional classes, regardless of their specific realization (cf. the shaded lines in Table 7.2). Carstairs (1987: 93) sums up the usual conclusion succinctly: ‘It is reasonable to conclude that we are dealing with something systematic and genuinely part of what the native Latin speaker ‘knew’, not a linguist’s construct or a mere accidental homonymy between two Case-forms. (At the very least, the onus of proof is on the linguist who wants to contend otherwise.)’

There are two features of the Latin dative/ablative plural that make it a compelling example. The first is that the identity holds across several different realizations of the relevant suffix (*-is*, *-ibus*, *-bis*). Moreover, the identity is exceptionless; there are no inflectional classes or irregular lexical items in which the two forms are distinct. In the case of German, the identity of the 1pl/3pl *-en* is also metasyntactic: as mentioned above, the 1pl and 3pl forms are identical for every single verb in the language, sharing the same stem allomorph and the same suffix, even in highly irregular or suppletive verbs such as *sein* ‘to be’: *sind* ‘be.PRS.1PL/3PL’. Thus, the heuristic of metasyntacticism would support treating the 1pl/3pl identity as systematic.

Evidence from metasyntacticism can be especially important in cases of syncretisms that involve featurally disparate sets of items. For example, Corbett (1991: 119–21) discusses the distribution of gender agreement markers in the Northeast Caucasian language Khinalug, shown in Table 7.3. Among the first series, we see that the singular agreement marker for the third gender (*b-*) is identical to the plural agreement marker for genders one and two (also *b-*). On the face of it, genders 1/2 plural and gender 3

TABLE 7.2. Metasyntacticism of Latin dative and ablative plural

	‘star’	‘slave’	‘leader’	‘bird’	‘hand’	‘thing’	‘I’	‘you’
NOM.SG	stella	servus	dux (=ducs)	avis	manus	rēs	egō	tū
DAT.SG	stellae	servō	duci	avi	manui	rei	mibi	tibi
ABL.SG	stella	servō	duce	avi	manū	rē	mē	tē
NOM.PL	stellae	servi	ducēs	avēs	manū	rēs	nōs	vōs
DAT.PL	stellis	servis	ducibus	avibus	manibus	rebus	nobis	vobis
ABL.PL	stellis	servis	ducibus	avibus	manibus	rebus	nobis	vobis

TABLE 7.3. Gender marker syncretism in Khinalug (Corbett 1991: 119–21)

Gender	Series 1		Series 2		Series 3	
	SG	PL	SG	PL	SG	PL
I	∅	b-	j-	v-	h-	f-
II	z-	b-	z-	v-	s-	f-
III	b-	∅	v-	j-	f-	h-
IV	∅	∅	j-	j-	h-	h-

singular do not form a natural class of contexts, and we might be tempted to treat this as a case of accidental homophony. However, comparison with series 2 and 3 shows that this is a recurring (metasycretic) pattern in Khinalug, which may lend support to an analysis that treats the identity as meaningful.

The identity between the 3sg and 2pl in the German present tense likewise involves two featurally dissimilar forms. In this case, the identity proves to be more restricted than the 1pl and 3pl identity: the 3sg and 2pl are sometimes distinct due to stem allomorphy (*trägt-t* 'carry-3SG' vs. *trägt-t* 'carry-2PL'; *hät-t* 'have-2PL'; *hält* 'hold-3SG' vs. *hältet* 'hold-2PL'), suffixal differences (*kann-Ø* 'can-3SG' vs. *könn-t* 'can-2PL'), or suppletion (*ist* 'be-3SG' vs. *seid* 'be-2PL'). They are also distinct in other tenses, such as the simple past (*sag-t-e* 'say-PAST-3SG' vs. *sag-t-et* 'say-PAST-2PL'), whereas the 1pl and 3pl are identical in all tenses and moods. (The analysis of this difference between tenses will be discussed in greater detail in section 7.2.) The fact that the 3sg/2pl identity is seen for just one set of affixes, and even there, it breaks down in certain tenses and in certain inflectional classes, might lead us to question whether this identity is accidental rather than systematic.

Unfortunately, although exceptionless metasycretisms are a useful indication that a particular instance of syncretism is likely to be systematic, it seems unlikely that they are either a sufficient or necessary precondition to analyzing a particular instance of identity as morphologically significant. On the one hand, there is of course no guarantee that just because the same identity occurs multiple times within the same language, that it is too much of a coincidence to be accidental. One could well imagine a situation in which a recurring syncretism had arisen for historical reasons (for example, if the ablative singular happened to be borrowed or innovative), but speakers were nonetheless forced to analyze it as synchronically coincidental. Conversely, there appear to be cases in which a syncretism is not exceptionless, but is nonetheless pervasive enough to appear systematic. For example, the Latin vocative and nominative are identical for all inflection classes in the plural, and for all inflection classes but one in the singular (the only exception being second declension masculine nouns in *-us*: nominative *Marcus*, vocative *Marce!*). The fact that the vocative is occasionally morphologically distinct from the nominative in the singular but is never distinct in the plural does not normally seem to be taken as evidence that nominative/vocative syncretism is systematic only in the plural. To this may also be added the fact that in many cases, a syncretism appears to be meaningful but the language does not provide corroborating evidence from multiple inflection classes of a systematic metasycretism. Thus, we conclude that although metasycretisms are a useful heuristic in helping linguists to establish that a particular identity is significant and non-accidental—and may even serve as evidence to learners that the same morpheme is involved—they cannot be the only means by which we determine what constitutes a 'true' (non-accidental) syncretism.

### 7.1.2 Syntactic evidence

The literature on feature agreement and mismatches provides a probative diagnostic for linguistically significant syncretism. Pullum and Zwicky (1986) provide a simple

example: in 'ordinary' cases of coordination, a sentence containing a coordinated element must be compatible with each the conjuncts independently; thus, a sentence such as (1a) is fine because *He's a Republican* and *He's proud of it* are both grammatical, whereas the sentence in (1b) is ungrammatical because *Proud of it* was elected president is ungrammatical (Sag, Gerald, Wasow, and Weister 1985).

- (1) a. He's a Republican and proud of it.  
b. \*A Republican and proud of it was elected president.

The same condition can be seen to hold in (2a), where neither form of the verb 'to be' is compatible with both members of the coordinated phrase *either you or I*, and the result is judged awkward or ungrammatical. When verb forms are the same for both members, however, as with 2sg and 3pl 'are', coordination is unproblematic (2b).

- (2) a. Either you or I \*am/\*are wrong.  
b. Either you or they are wrong.

Similar examples have been observed for syncretic nominal forms satisfying different case requirements of multiple predicates in coordination (Zaenen and Karttunen 1984, Pullum and Zwicky 1986, Citko 2005), free relatives (Bresnan and Grimshaw 1978, Groos and van Riemsdijk 1981, Harbert 1983, Ingria 1990, Vogel 2001), or different gender agreement (Eisenberg 1973, Zaenen and Karttunen 1984, Pullum and Zwicky 1986). For example, Citko (2005) points out that it is impossible to do across-the-board extraction of *wh*-elements from coordinated structures when the two predicates assign different cases, if the relevant *wh*-pronoun would be distinct for the cases in question. For example, the Polish verb *lubić* 'love' assigns accusative case while the verb *nienawidzić* 'hate' assigns genitive case. Since the case forms of *co* 'what' are distinct for the accusative and genitive (cf. Table 7.4), *wh*-extraction is impossible in sentences like (3a), since the pronoun cannot satisfy the case requirements of both conjuncts simultaneously. The accusative and genitive forms of *któ* 'who', on the other hand, are syncretic, and the equivalent sentence (3b) is judged to be acceptable.

- (3) a. \*Czego/\*Co Jan nienawidzi a Maria lubi?  
what.GEN/what.ACC Jan hates and Maria loves  
b. Kogo Jan nienawidzi a Maria lubi?  
WHO.GEN/ACC Jan hates and Maria loves

In a similar vein, case syncretism seems to resolve case conflicts in free relative clauses. It is a well-known fact that the *wh*-element introducing free relatives must satisfy the

TABLE 7.4. Case syncretism in Polish *wh* forms

	'who'	'what'
NOM	któ	co
ACC	kogo	co
GEN	kogo	czego

case requirements of both the matrix and the embedded predicate (case matching; cf. Groos and van Riemsdijk 1981). Compare the following examples from German:

- (4) a. Ich nehme, wen du mir empfiehlst.  
I take who.ACC you me recommend  
'I will take who you recommend to me.'  
b. \*Ich nehme, wer dich überzeugt hat.  
I take who.NOM you.ACC convinced has  
'I will take who has convinced you.'

In (4), the matrix predicate *nehmen* 'to take' selects an accusative object. As indicated by the contrast between (4a) and (4b), it seems that a free relative is only licensed as a direct object if there is no conflict between the case requirements of the matrix and embedded predicate (i.e. the morphological case of the *wh*-element). However, the fact that (5) is fully grammatical—despite a mismatch in abstract case features—shows that case mismatches with free relatives can be resolved by case syncretism (as shown in Table 7.5, the nominative and accusative forms of the neuter *wh*-pronoun *was* are identical in German).<sup>4</sup>

- (5) Ich nehme, was dich überzeugt hat.  
I take what.NOM you.ACC convinced has  
'I will take what has convinced you.'

The analysis of how syncretic case or person/number forms can satisfy multiple syntactic requirements simultaneously is an area of much debate (see especially

TABLE 7.5. Case syncretism in German *wh*-pronouns

	'who'	'what'
NOM	wer	was
ACC	wen	was
DAT	wem	(was) <sup>5</sup>
GEN	wessen	wessen

<sup>4</sup> The grammaticality of (5) shows that case matching primarily concerns the morphophonological shape of a relevant form and not the abstract case features that it represents in a specific syntactic context.

<sup>5</sup> The dative neuter form *was* occurs only after prepositions (Duden 2006: 314):

- (i) Von was sprichst du?  
of what.DAT speak you  
'What are you talking about?'

However, it appears that in questions involving non-animate dative *wh*-objects there is a gap in the paradigm: neither *was* nor the personal *wh*-pronoun *wem* can be used:

- (ii) \*Wem/<sup>6</sup>was gleicht dieses Haus?  
who.DAT/what.DAT resembles this house  
'What does this house resemble?'

Pullum and Zwicky 1986, Ingria 1990, Dalrymple and Kaplan 2000, Citko 2005, Dalrymple, King, and Sadler 2009), but what is important for present purposes is that such examples have the potential to provide an important diagnostic for whether a particular syncretism is systematic or accidental. Returning to the example of the German 1pl/3pl identity, we see that coordinations parallel to the English 'either you or they are...' are possible, while coordinations involving, for example, 1pl and 2pl are not (Eisenberg 1973, Pullum and Zwicky 1986, Wunderlich 2003). The comparison between (6a) and (6c) comes from Wunderlich (2003), while the comparison between (7a) and (7c) is based on examples from Eisenberg (1973). Both show that for at least some speakers, coordination is possible only when the verb form is compatible with both conjuncts independently. Crucially, however, example (6c) is judged to be awkward or unacceptable, even though the verb form *gewinnt* 'win' is ambiguous between 3sg and 2pl.

- (6) a. Entweder wir oder sie gewinnen.  
either we or they win-1PL/3PL  
'Either we or they will win.'  
b. Entweder wir oder ihr \*gewinnen/\*gewinnt.<sup>6</sup>  
either we or you.PL win-1PL/win-2PL  
c. Entweder er oder ihr \*?gewinnt  
either he or you.PL win-3SG/2PL

- (7) a. ... weil wir Bier und sie Milch trinken.  
because we beer and they milk drink-1PL/3PL  
'because we drink beer and they drink milk'  
b. ... weil wir Bier und ihr Milch \*trinken/\*trinkt  
because we beer and you.PL milk drink-1PL/drink-2PL  
c. ... weil er Bier und ihr Milch \*?trinkt.  
because he beer and you.PL milk drink-3PL/2PL

This syntactic evidence corroborates the morphological evidence discussed above that the identity of the 1pl and 3pl has a different status from that of the 3sg and 2pl, and suggests that speakers may treat the former as a meaningful syncretism but the latter as an accidental homophony.

In a similar vein, Fanselow and Frisch (2006) found that German speakers more readily accept disjunctions of 1sg and 3sg when the two are identical, as is the case with a small set of verbs in the present tense, and all verbs in the past tense. Thus, 1sg/3sg disjunctions involving non-identical 1sg/3sg marking, such as (8a), are judged significantly less acceptable than those involving identical marking

<sup>6</sup> Examples of mismatched agreement: normally with agreement to the closer conjunct, are permitted by some speakers: *entweder wir oder ihr gewinnt* 'either we or you.PL win-2PL'. This is true also for 3sg/2pl examples in which the verb forms would be different, and 2pl is preferred (*entweder er or ihr seid/\*ist... 'be-2PL/\*3SG'*); *bis entweder er oder ihr sterbt/\*stirbt 'die-2PL/\*3SG'*. Pullum and Zwicky (1986: 755) point out some speakers permit resolution of mismatches in favor of the nearest conjunct in English, as well.

(8b,c). It is especially worth noting that the present tense identity in (8b) is not supported by metasycretism, and is seen in only a small handful of verbs (mostly modals). This underscores a point made in the previous section, that metasycretism is almost certainly not a precondition for treating identical forms as morphologically syncretic.

- (8) a. Er oder ich \*schlafe/\*schläft.  
 he or I sleep-1SG/3SG  
 (Intended:) 'He or I sleep'  
 b. Er oder ich darf schlafen.  
 he or I may-1SG/3SG sleep  
 'He or I may sleep'  
 c. Er oder ich rief spät an  
 he or I called-1SG/3SG late up  
 'He or I called late'

The examples up to this point have suggested an interpretation in which two different feature requirements may be satisfied if the same morpheme is used to realize both feature combinations (e.g. -en '1PL/3PL'), but they may not be satisfied by two different morphemes that happen to have the same phonological representation (e.g. -t '3SG' vs. -t '2PL'). These examples can both be compared with one last possibility, which is that two feature combinations are realized with underlyingly distinct morphemes that happen to be neutralized in their surface form by phonological processes. For example, the Yiddish verb *arbet-n* 'work', when combined with the 3sg or 2pl suffix -t, yields /arbet-t/ → [arbet] by a process of final degemination or haplology (Jacobs 2005). The resulting form is homophonous with the 1sg (-Ø) form: /arbet-Ø/ → [arbet]. As in German, it is possible to resolve 1pl/3pl mismatches with the syncretic suffix /-ən/ (or syllabic -n) (9a), while conjunctions of 3sg and 2pl are awkward or ungrammatical (9b). Mismatches involving 1sg/-Ø/ and 3sg /-t/, however, are decidedly worse, even if the two forms are identical on the surface (9c).<sup>7</sup>

- (9) a. Ven mir oder zey arbetn shver....  
 if we or they work-1PL/3PL hard  
 'If we or they work hard...'  
 b. Ven er oder ir \*?arbet shver....  
 if he or you.PL work-3SG/2PL hard  
 'If he or you(pl.) work hard...'  
 c. Ven ikh oder er \*arbet shver...  
 if I or he work-1SG/2PL hard  
 'If I or he work hard...'

<sup>7</sup> However, note that many Yiddish speakers appear to permit resolution to either the first or nearest conjunct, making the examples in (9) fully acceptable.

Similarly, Asarina (2010) found that in Russian coordinations involving verbs that select different case forms of the noun are improved when the two forms are deemed morphologically identical (e.g. inanimate nominative/accusative: (10a) better than (10b)). However, the same is not true when the two forms are underlyingly morphologically and phonologically distinct (/lozh-o/ 'bed-ACC.' vs. /lozh-e/ 'bed-PREP.') but become identical through a process of stressless vowel reduction: [lɔzhi] 'bed-ACC/PREP'. Thus, (11a) is not judged any better than (11b).

- (10) a. On ne ostavl, tak kak emu nadoelo, bijudc-e....  
 He not kept(ACC) as him sick-of(NOM) saucer-NOM/ACC  
 'He didn't keep, as he was sick of, the saucer...'  
 b. \*On ne ostavil, tak kak emu nadoelo, tarlk-a....  
 He not kept(ACC) as him sick-of(NOM) plate-NOM  
 'He didn't keep, as he was sick of, the plate...'
- (11) a. On ne nastupil, a sidel, na lózh-[i]....  
 he not stepped(ACC) but sat(PREP) on bed-ACC/PREP  
 'He did not step on, but sat on, the bed...'  
 b. On ne nastupil, a sidel, na vedr-é....  
 he not stepped(ACC) but sat(PREP) on bucket-PREP  
 'He did not step on, but sat on, the bucket...'

To date, few studies have explicitly compared the consequences of different types of identity on syntactic acceptability judgments using comparable materials within the same language. If the comparisons reported here turn out to be representative, we could conclude that the acceptability of such constructions rests at least in part on identity at a morphological level, rather than surface phonological identity.<sup>8</sup> Such tests could provide powerful evidence for systematic syncretism—that is, identity at the morphological level—as opposed to accidental homophony.<sup>9</sup>

### 7.1.3 Psycholinguistic evidence

Another promising source of evidence for the distinction between accidental homophony and 'true' syncretism comes from experimental paradigms involving reactions to repeated exposure to identical elements. A large body of research on morphological priming effects has established that exposure to a word or morpheme facilitates subsequent recognition of that same morpheme (for reviews, see McQueen

<sup>8</sup> Pullum and Zwicky (1986) argue that coordinations involving phonologically homophonous items can in fact be judged acceptable in certain conditions; these cases require further investigation. Crucially, however, we are not aware of any case in which surface identity as a result of neutralizing phonological processes has been claimed to satisfy conflicting syntactic featural requirements.

<sup>9</sup> Fanselow and Frisch (2006) provide a processing-based interpretation of resolutions such as 'er oder ich darf...' 'he or I need.1sg/3sc.'. According to this account, such mismatches are actually ungrammatical, but are easy to resolve (or hard to reject) due to the surface identity of the two forms involved. This is an important possible approach, but it is not clear to us how to account for differences between acceptable identities (German 1sg/3sg darf) and unacceptable identities (Yiddish 1sg/3sg arbet).

and Cutler 1998, and Marslen-Wilson 2007). The question of interest from the point of view of separating true syncretism from accidental homophony is whether it is possible to distinguish priming effects among items that undeniably share a morpheme from priming effects among accidentally homophonous items.

A number of studies have investigated the degree and time course of priming among unrelated homonyms, such as *bug* meaning *insect* vs. *recording device*. Swinney (1979) played subjects spoken sentences that contained homonyms in biasing contexts (e.g. the word *bug* in a sentence about spies), and at the same time, presented orthographic stimuli that were semantically related to the other meaning of the word (e.g. *insect*) for lexical decision. The results showed that in spite of the inappropriate context, both meanings of the homonym appear to be activated by its presentation, as revealed by faster reactions to their semantic associates. This effect disappears extremely quickly, however, perhaps due to suppression of the unintended homonym once the correct lexical item has been identified. (See Elston-Güttler and Friederici, 2005, for a review of related findings, using both priming and also brain imagining techniques).

Based on this and similar results concerning the time course of activation of homonyms, one might hope to investigate whether activation of 2pl-*t* in German by presentation of 3sg-*t* bears the hallmarks of robust and long-lasting identity priming, or like the fleeting homonymy priming. Unfortunately, unlike the two meanings of a homonymous lexical item like *bug*, the meanings of *lebt* 'live-3sg' vs. *lebt* 'live-2pl' are not sufficiently different to be able to test easily for priming of different semantic associates, and we are not aware of any studies that have managed to distinguish processing of accidentally homophonous morphological forms based on their difference in meaning. There are some hints that priming effects may differ between homophonous inflected forms, however. Clahsen, Sonnenstuhl, Hadler, and Eisenbeiss (2001) presented subjects with inflected German present tense verb forms, accompanied by subject pronouns in order to establish a context that should facilitate recognition of the intended form: e.g. *ich lebe* 'I live-1sg', *du lebst* 'you live-2sg', *ihr lebt* 'you.PL live-2pl', *er lebt* 'he live-3sg'. Subjects were then presented visually with 1sg forms (e.g. *lebe*) for lexical decision. As expected, responses to 1sg forms after hearing a 1sg form were fastest (repetition priming). What is important for the current discussion, however, is that responses to 1sg forms after hearing 2sg *lebst* or 2pl *lebt* were also facilitated—in fact, to an extent statistically indistinguishable from identity priming of 1sg on itself. Presentation of the 3sg form *lebt*, on the other hand, did not lead to the same degree of facilitation; in other words, processing 2pl *lebt* and 3sg *lebt* did not yield identical effects.

It must be acknowledged that this result is open to multiple interpretations, since the presentations of 3sg vs. 2pl *lebt* necessarily differed not only in their morphological features, but also in the pronouns that were presented (*er* vs. *ihr*), which conceivably have played some confounding role in processing the verb form. The interpretation that Clahsen et al. (2001) provide is relevant to the issue of syncretism: they propose that the high frequency of the 3sg allows listeners to access it as a whole form without decomposing it; thus, the representations of the 3sg and 2pl differ

from one another (*lebt* vs. *lebt-t*).<sup>10</sup> Crucially, whether it is frequency or some other difference that distinguishes the 3sg from the 2pl, it is evidently not the case that they are processed identically. Although we may draw only limited conclusions based on this result alone, this type of evidence has the potential to cast doubt on analyses that posit a single representation for the 3sg/2pl syncretism. At the very least, experimental evidence that homophonous inflected forms are processed differently places a burden on the analyst to explain how this can be, if they are represented identically.

## 7.2 Theoretical approaches to syncretism

In this section, we will review a selection of theoretical approaches to syncretism that have been proposed in the literature, including underspecification (Jakobson 1936, Bierwisch 1967, Andrews 1990, Blevins 1995), impoverishment (Noyer 1992, 1998, Halle 1997, Harley 2008), rules of referral (Zwicky 1985, Stump 1993a, 2001), and approaches based on violable interacting constraints (Trommer 2001, McCarthy 2005, Wunderlich 2004, Müller 2007, 2008b, Xu 2007).<sup>11</sup> The discussion of current formal models of syncretism is organized around a particular data set, focusing on properties of verbal inflection in German to illustrate different modes of analysis and further sharpen our view of different types of syncretism. Standard German makes a useful test case, since it shows an instructive mix of seemingly significant and accidental syncretism (including, e.g. plural *-en* vs. 3sg/2pl *-t*), and there are detailed morphological analyses to draw on (e.g. Bierwisch 1961, Pike 1965, Wiese 1994, Wunderlich 1996, Frampton 2002, Müller 2006b, c to name a few). Consider the data set in Table 7.6, which includes past and present forms for three verbs representing the major inflection classes.

Taking a closer look at Table 7.6, we can identify at least two cases of non-accidental syncretism that any analysis has to account for:

- 1pl and 3pl forms are syncretic in all tenses and paradigms
- 1sg and 3sg are identical in all past tense paradigms

Note that in spoken varieties of German (and more generally in most dialects) the schwa-suffix occurring in 1sg-prs is in fact only a facultative ending, which is often realized as zero (cf. Veith 1977, Richter 1982, Eisenberg 1994: 111; basically the same goes for the schwa in the present plural endings). The difference between 1sg-prs (where the schwa may occur) and 1sg-past of strong verbs (where it must not occur) can possibly be attributed to a (surface) constraint (at work in more formal registers)

<sup>10</sup> Clahsen et al. eventually reject this explanation, based on the fact that in a subsequent experiment the 3sg does not show the same lack of priming. This discrepancy is not predicted by either the whole-form access account, nor is it expected based on the paradigmatic structure that Clahsen et al. posit; further work is needed to determine the details of what factors influence the degree of facilitation among morphologically related inflected forms.

<sup>11</sup> Many of these mechanisms and the cases of syncretism they derive may also be considered sources/cases of zero exponence (of morphosyntactic features neutralized under syncretism). See Trommer (this volume) for detailed discussion.



TABLE 7.6. Syncretism in German verb inflection (three main conjugations)

	Weak conjugation: <i>legen</i> 'put'		Strong conjugation: <i>singen</i> 'sing'		Suppletive conjugation: <i>sein</i> 'be'	
	PRESENT	PAST	PRESENT	PAST	PRESENT	PAST
1SG	leg-e	leg-te	sing-e	sang	bin	war
2SG	leg-st	leg-te-st	sing-st	sang-st	bist	war-st
3SG	leg-t	leg-te	sing-t	sang	ist	war
1PL	leg-en	leg-te-n	sing-en	sang-en	sind	war-en
2PL	leg-t	leg-te-t	sing-t	sang-t	seid	war-t
3PL	leg-en	leg-te-n	sing-en	sang-en	sind	war-en

TABLE 7.7. Syncretism (1sg, 3sg) in German

	Present		Past	
	SINGULAR	PLURAL	SINGULAR	PLURAL
1ST	Ø	-(ə)n	Ø	-(ə)n
2ND	-st	-t	-st	-t
3RD	-t	-(ə)n	Ø	-(ə)n

against realizing a bare present tense stem; cf. Müller (2006b: 100). In the 1sg past and 3sg past of strong forms, this requirement is fulfilled by stem vowel alternation, blocking schwa-affixation. Under these assumptions, we can say that outside the context of the present tense (where the 3sg is realized as /-t/), the 1sg and 3sg take the same form, as shown in Table 7.7.

Apart from these straightforward instances of syncretism, Müller (2006a, b) identifies two additional cases, which involve subanalysis of inflectional markers (cf. Pike 1965 for a related suggestion concerning *sein* 'to be'):

- In the weak and strong conjugation, the suffix used to mark 3sg prs and 2pl prs is identical (/t/). Recall that this presumably has to be treated as an instance of partial syncretism, since it is not always the case that the complete word forms are homophonous (with certain strong verbs, 3sg is additionally marked by stem vowel alternation, e.g. *läuft* 'walk-3SG' vs. *läuft* 'walk-2Pl').
- After decomposing the 2sg marker /-st/ into /-s/ and /-t/, we arrive at an additional instance of syncretism where final /-t/ shows up in 2sg and 3sg prs contexts.

7.2.1 Underspecification and blocking

Perhaps the most widely assumed mechanism for capturing the fact that a given morpheme recurs with different morphosyntactic functions is *underspecification*: by omitting feature [F] from the specification of a morpheme, it is made neutral

with respect to the value of [F], and may be employed both in [+F] and [-F] contexts. The simplest use of underspecification is to allow a morpheme to occur in a set of contexts that share particular feature values. For example, adopting the widespread assumption that person features may be decomposed into the binary features [±SPEAKER] and [±HEARER], the syncretism between 1pl and 3pl -en can be represented by allowing the morpheme to be specified simply as [-HEARER, +pl] (that is, omitting the [±SPEAKER] specification). Thus, the morpheme is made compatible with all non-second person plural forms (Jakobson 1936, Bierwisch 1967, Andrews 1990, Halle and Marantz 1994, Blevis 1995, Harley 2008, and many others). Simple underspecification of this sort is an appealing mechanism because it provides an extremely restrictive, and therefore predictive, theory of what combinations of 'cells' a given morpheme can express—namely, combinations that constitute a natural morphological class.<sup>12</sup> In the case of 1pl/3pl -en, underspecification is possible because the two cells {1pl [+SPEAKER, -HEARER, +pl], 3pl [-SPEAKER, -HEARER, +pl]} share the feature values [-HEARER, +pl].

Underspecification alone does not work to capture the present tense 3sg/2pl -t syncretism. Setting aside for the moment the possibility that this identity is actually accidental homophony in modern German, we consider here how this identity might be analyzed, if evidence were to emerge that speakers treat it as morphologically significant. Assuming that the only feature value that 3sg and 2pl have in common is [-SPEAKER], there is no way to specify the set {3sg, 2pl} to the exclusion of 2sg and 3pl; in other words, 3sg and 2pl by themselves do not constitute a natural class. In order to capture such distributions with underspecification, we require one additional mechanism: ordering with blocking. For example, let us assume that the 2sg suffix -st is represented as [+HEARER, -pl] (or, with the redundant/non-minimal specification [-SPEAKER, +HEARER, -pl]), while the 3sg/2pl suffix -t is represented as [-SPEAKER]. In principle, both are compatible with a 2sg context [-SPEAKER, +HEARER, -pl], but -st realizes more of the features provided by the context. A very natural assumption is that in the competition between -st and -t to realize the features [-SPEAKER, +HEARER, -pl], the more specific item -st gets priority, and that application/insertion of -st blocks the more general item -t (the Elsewhere Condition, or Subset Principle or Pānini's Principle: Paul 1896, Kiparsky 1973a, Aronoff 1976, Anderson 1992, Halle and Marantz 1993, Halle 1997 and many others; cf. also Bonet and Harbour this volume: §6.3.1).

Blocking by prior insertion of more specific morphemes greatly expands the set of possible syncretisms that can be captured by underspecification, since it allows us to capture combinations of cells which are not by themselves a natural morphosyntactic class, but which represent a subset of cells from a natural class that are not covered by more specific elements. In the limiting case, a morpheme may be assigned no featural specification at all, allowing it to appear as a default in all cells not covered by a more specific morpheme.

<sup>12</sup> The set of available natural classes depends on the precise feature system that is employed. In a system with relatively little feature decomposition (e.g. [1st], [2nd], [3rd]), there are few natural classes, and correspondingly fewer syncretisms can be captured. Of course, much of this predictive power is lost if the feature system is so expressive as to cross-classify all inflected categories; we assume the limited set of person/number features [±SPEAKER], [±HEARER], and [±pl].

Continuing for the moment to confine ourselves to person/number marking in the present tense, the following set of specifications would suffice to derive both the 1pl/3pl syncretism (underspecification for [ $\pm$ HEARER]) and the 3sg/2pl (underspecification for [ $\pm$ HEARER], [ $\pm$ pl], and possibly even [ $\pm$ SPEAKER]).

(12) *Person/number Vocabulary items with underspecification and blocking (present tense):*

[+SPEAKER, (-HEARER), -pl]	↔	/(-ə)/
[(-SPEAKER), +HEARER, -pl]	↔	/-st/
[(-HEARER, +pl)]	↔	/(-ə)n/
[(-SPEAKER)/elsewhere]	↔	/-t/

These simple mechanisms are insufficient when we take into consideration one additional syncretism, however: that between the present tense 1sg, past tense 1sg, and past tense 3sg. As mentioned above, there is reason to think that this is a non-accidental syncretism, since it occurs exceptionlessly across all inflection classes (strong and weak). Furthermore, it occurs in not just the past, but also the subjunctive (and even in some irregular present tense verbs). An underspecification approach to the distribution of  $-\emptyset$  would require that it be compatible with all non-second person singular contexts: [-HEARER, -pl].<sup>13</sup> This specification is also consistent with the present tense 3sg, so the challenge is to get  $-t$  to occur in this context instead. We could specify  $-t$  as the more specific [-SPEAKER, +present] in order to cover both 2nd and 3rd person singular and plural cases, but this has two problems: first, it is no longer less specific than  $-en$  ([-HEARER, +pl]), so there is no reason why  $-en$  should be used instead of  $-t$  in the 3pl. What's worse, restricting  $-t$  to the present tense in this way fails to account for why it is also used for the 2pl in the past tense.

We conclude that using just the mechanisms of underspecification and blocking, the only way to describe the distribution in Table 7.6 is to posit that the 3sg present and 2pl present/past are separate morphemes. This may actually be a positive result, given the discussion above concerning the different status of 1pl/3pl syncretism vs. 3sg/2pl syncretism as diagnosed by feature mismatch resolution under coordination. In this case, we might conclude that a restrictive theory of syncretism is able to predict which distributions learners treat as significant, and which must be treated as accidental. Given the tentativeness of the evidence in section 7.1, however, it nonetheless seems worthwhile to explore mechanisms to capture such cases of syncretism, under the assumption that some patterns that cannot be described with simple underspecification will indeed prove to be non-accidental.

### 7.2.2 *Imposition*

Imposition rules delete a subset of the features contained in a given inflectional category/head, prior to the insertion of vocabulary items into terminal nodes. For this reason, they represent a more powerful tool to model systematic syncretism. Imposition rules can play two distinct roles in the analysis of syncretism. First,

<sup>13</sup> Another possibility, not explored here, is that there are multiple zero markers.

because they alter feature specifications prior to Vocabulary Insertion, they provide a direct means for modeling system-wide metasyntactic changes, in which two forms are always identical regardless of the morphemes involved. The deletion of features or feature values may also widen the distribution of less specified Vocabulary items, since it permits them to be inserted in contexts where their use was previously blocked by more specified forms. The following analysis of German verb inflection in terms of imposition is based, with minor modifications, on Frampton (2002) and Müller (2006a, b), who assume decomposition of morphosyntactic features such as person into more primitive features.<sup>14</sup> Continuing to assume that person features are represented by [ $\pm$ SPEAKER] and [ $\pm$ HEARER], the relevant imposition rules that derive the major patterns of syncretism (identity of 1pl and 3pl, and 1sg.past and 3sg.past) can be stated as in (13).

(13) *Imposition rules for German verb inflection:*

- a. [ $\pm$ SPEAKER]  $\rightarrow$   $\emptyset$ /[-HEARER, +pl]  
 b. [ $\pm$ SPEAKER]  $\rightarrow$   $\emptyset$ /[-HEARER, -pl, +past]

Rule (13a) neutralizes the distinction between first and third person in the plural via neutralizing the feature [ $\pm$ SPEAKER] (which serves to differentiate between first and third person). As a result, 1pl and 3pl must always be realized by the same exponent. Rule (13b) does the same for the distinction between 1sg and 3sg in the past tense, giving rise to the second system-defining syncretism mentioned above.

Abstracting away from suppletion, the following inventory of Vocabulary items serves to account for the major cases of person/number syncretism in the verbal inflection of German (in the past tense of weak/regular verbs, the relevant affixes attach to the past tense marker  $/-tə/$ ; cf. Eisenberg 1994: 110f., Müller 2006a, b):

(14) *Person/number Vocabulary items with imposition:*

[+HEARER, -pl]	↔	/-st/
[-HEARER, +pl]	↔	/(-ə)n/
[-SPEAKER]	↔	/-t/
elsewhere	↔	/(-ə)/

The marker  $/-st/$ , which is specified for both person ([+HEARER]) and number ([-pl]), is used in all 2sg contexts (including the suppletive paradigm if *bist* is analyzed as *bi+stf*). The plural marker  $/(-ə)n/$  may be inserted into inflectional nodes characterized by the feature [-HEARER] (i.e. in non-2nd person contexts). Note that even without the imposition rule in (13a), the [-HEARER, +pl] specification would be sufficient to capture the 1pl/3pl syncretism for this marker; the imposition rule captures the fact that this identity holds not only for 1pl/3pl  $/-en/$ , but also for suppletive items such as *sind* 'be-1PL/3PL' (metasyntactic). The marker  $/-t/$  is compatible with all 2nd and 3rd person contexts. However, its use as a realization of 2sg is blocked by the existence of a more specific marker  $/-st/$ , due to

<sup>14</sup> The analysis presented differs from Müller's (2006b, c) analysis in that for expository reasons, we do not make use of lexical decomposition and Fission (e.g. Müller decomposes 2sg  $/-st/$  into 2sg  $/-s/$  and  $/-t/$  realizing [-SPEAKER]).



(some form of) the Elsewhere Condition (discussed in the previous section). For the same reason, /-t/ cannot be inserted as a marker of 3pl, since /-(ə)n/ is more specified.<sup>15</sup> In addition, the distribution of /-t/ is restricted by the impoverishment rules in (13) that delete the feature [±SPEAKER] under the appropriate circumstances (discussed shortly in some more detail). As a result, /-t/ shows up only in 3sg-prs and 2pl contexts, which captures the partial syncretism of these cells noted above. Finally, there is the elsewhere marker /(-ə)/, which can be inserted anywhere as long as there is not a marker which is more specified. As already pointed out above, the elsewhere marker may appear either as Ø or as schwa, dependent on whether an overt realization is called for to avoid a bare present tense stem (in certain registers). The directionality effect illustrated in Table 7.7 (1sg → 3sg) can then be attributed to the workings of the impoverishment rule (13b) in the following way. Under the standard assumption that Vocabulary Insertion is governed by some form of the Elsewhere Condition (e.g. Halle's 1997 Subset Principle), /-t/ outranks /(-ə)/ in the context of 3sg in the present tense. In the past tense, however, /-t/ cannot any longer be inserted as marker of 3sg, since its feature specification is incompatible with the content of the relevant inflectional node after impoverishment is incompatible with the content of the domain of the elsewhere marker /(-ə)/. In this way, impoverishment can be used to model directionality effects as a 'retreat to the general case' (Halle and Marantz 1994: 278).<sup>16</sup>

### 7.2.3 Rules of referral

Zwicky (1985) argues that a realizational theory of inflection must include two separate kinds of realization rules. First, there are rules of exponence which state how certain combinations of morphosyntactic features (in certain morphosyntactic contexts) are realized by morphophonological material. Second, the grammar must incorporate rules of referral which basically stipulate that certain feature combinations are realized in the same way (i.e. by the same exponent) as other feature combinations. The latter rule type is a powerful tool to describe (systematic) inflectional syncretisms (cf. Snump 1993a, 2001 for a formal theory of rules of referral in the context of Paradigm Function Morphology; see Corbett and Fraser 1993 for the use of rules of referral in the context of Network Morphology). It should be noted, though, that

<sup>15</sup> Note that the competition between /-t/ and /-(ə)n/ cannot be resolved by the Elsewhere Condition in the form as originally proposed by Kiparsky, which enforces disjunctive ordering of rules only when their structural descriptions stand in a proper inclusion relationship. Since the specification of /-(ə)n/ does not properly include that of /-t/, one must invoke something like Halle's (1997) Subset Principle, which requires the more specific marker to match a greater number of features in the target, but not to subsume the specifications of the more general marker. We thank an anonymous reviewer for helping us to clarify this issue.

<sup>16</sup> If it is further assumed that impoverishment may not only delete features/feature values (or, nodes in a feature geometry), but in addition may replace marked feature values by default values, impoverishment can also be used to handle other types of directionality effects (Noyer 1998, Bobaljik 2002). Still, it seems that even under this 'liberal' interpretation, impoverishment rules are more restrictive than alternative means to model directionality effects such as rules of referral (Zwicky 1985, Snump 1993a, 2001), which in addition to 'retreat to the general case', can also force forms to resemble other, more marked forms (see below for some discussion; see Baerman et al. 2005: 160ff. for a critical assessment of impoverishment).

rules of referral merely state that certain inflectional markers are identical; in contrast to other approaches to syncretism (such as underspecification giving rise to natural classes) they do not attempt to derive patterns of syncretism from other 'deeper' properties of the relevant markers. Therefore, it is generally assumed that rules of referral should be invoked only for cases of syncretism that cannot be successfully captured by underspecification + blocking (e.g. directional syncretism; cf. Zwicky 1985, Snump 1993a, 2001, and §7.3.2 below). As an illustration, consider the following (informal) rules of referral that can be used to describe the systematic syncretisms that characterize the verbal inflection of German:

- (15) a. In all tenses and moods, the 1pl has the same form as the 3pl.  
b. In the past tense, the 3sg has the same form as the 1sg.

Under this approach, there are no rules of exponence for 1pl and past tense 3sg forms. Rather, 1pl forms such as *leg-en* 'put' simply follow from the existence of a rule suffixing /-en/ in 3pl contexts in combination with the rule of referral in (15a). Similarly, 3sg past tense forms like *war* 'be.PAST' are attributed to a relevant rule of exponence realizing 1sg past forms in combination with (15b).

Like impoverishment rules, rules of referral shift some of the burden of explaining syncretism from the lexicon/vocabulary to the grammar. This shift comes at a cost: in addition to learning a set of morphemes and their distributions, the learner must also discover a set of rules deriving certain forms from other forms. The extra cost may be justified, though, in cases where it helps to explain system-wide metasyncretism. For example, the fact that 1pl and 3pl are identical not only in their suffixal marking (-en), but also in suppletive forms (e.g. *sind* 'be.1PL/3PL') could be captured by the rule in (15a), in much the same way as the impoverishment rule in (13a).

In addition, grammatical rules may have exceptions or may be ordered with other rules so that they are not surface true. In such cases, we might expect to find evidence for 'overregularization'—that is, extending the pattern of the rule beyond its original domain. A possible example can be found in the history of German. The way (15a) is formulated implies that the marker used for 1pl is taken over from 3pl, and not vice versa. Interestingly, the 1pl/3pl identity has not always been as strong in German as it is now; in fact, in Old High German the two were often distinct: e.g. *lêbbê-mês* 'live-1PL' vs. *lêb-ent* 'live-3PL'. In many forms, the identity of the 1pl and 3pl appears to have come about as a result of general sound changes, such as weakening of final syllables and cluster simplification. In other cases, however, identity was created through analogical change; this includes the change from 1pl -mês to -en, and the change from *birum* to *sint* 'be.1PL'. As discussed in greater depth in section 7.4.2 below, such changes always extended the 3pl form to the 1pl. Such directionality effects in analogical change would make sense, if learners had encoded the syncretisms that occurred at the earlier stage of the language with rules of referral, which were then subsequently imposed on the rest of the system through overregularization (cf. Snump 1993a, 2001, Baerman et al. 2005; see section 7.3.2 below for more discussion).<sup>17</sup>

<sup>17</sup> As pointed out by an anonymous reviewer, the diachronic directionality effect that characterizes the transition from 3pl to 1pl in the history of German may also be captured by an impoverishment rule that

TABLE 7.8. Syncretism in Macedonian past tenses (Stump 1993a: 452)

padn- 'fall'	IMPERFECT			AORIST		
	I	II	III	I	II	III
1SG	padn	-e	-v	padn	-a	-v
2SG	padn	-e	-v	padn	-a	-v
3SG	padn	-e	-v	padn	-a	-v
1PL	padn	-e	-v	padn	-a	-v
2PL	padn	-e	-v	padn	-a	-v
3PL	padn	-e	-v	padn	-a	-v

Stump (1993a) argues that rules of referral are also called for to capture patterns of syncretism that cannot be captured via underspecification, such as in the verbal paradigm of Macedonian. As shown in Table 7.8, inflectional suffixes fall into three position classes (i.e. different slots in the sequence of inflections) which are marked by 'I' (markers for Imperfect vs. Aorist), 'II' (markers for past tense) and 'III' (person/number markers).

As indicated by shading, 2sg and 3sg forms are identical in the Imperfect and Aorist tenses. This syncretism carries over to other verb classes and it is assumed that it must be analyzed as a systematic property of the verbal inflection of Macedonian. As Stump points out, the 2sg and 3sg "do not obviously constitute a coherent morphosyntactic class" (p. 453) in the verbal inflection of Macedonian. In particular, it seems that the absence of the past tense marker /-v/ in 2sg contexts cannot be accounted for in terms of underspecification + blocking, since it occurs in 1st and 2nd (i.e. non-3rd) person contexts and in both numbers. He therefore proposes that this pattern should be accounted for by the following rule of referral:

- (16) In the past tenses, the second person singular has the same form as the third person singular.

According to this approach, the 2sg could be decreed to refer to the 3sg or vice versa. As mentioned above, some cases of 'non-default' syncretism can be handled by impoverishment rules; in fact, Bobaljik (2002) argues that 2sg/3sg syncretism in the past tenses of Macedonian is due to an impoverishment rule that deletes the second person feature value in the environment of [PAST], giving rise to identity with the relevant (default) 3sg forms. As mentioned above, if impoverishment rules are restricted to feature deletion, they allow a more restrictive set of syncretism patterns ('referral to the less marked') than the more general mechanism of rules of referral. An important question, therefore, is whether there exist patterns of syncretism that require the greater power of rules of referral. At least three relevant types of examples have been identified in the literature: (1) cases of 'syncretism with the more marked', argued to require not just impoverishment, but enrichment/feature

changes feature values from marked to unmarked (cf. note 16): [MSPEAKER] → [ASPEAKER] / [+pi] \_ (under the assumption that the negative value of [ASPEAKER] represents the unmarked case).

insertion (Noyer 1998, Harbour 2003); (2) polarity effects; and (3) cases of bidirectional syncretism (Stump 2001). The first, involving apparent feature insertion, are straightforward: if such cases can be shown to be morphologically significant and not accidental, then the extra power of referral or feature insertion is necessary. The second and third are taken up in greater detail in sections 7.3.1 and 7.3.2 below.

7.2.4 Optimality-theoretic approaches to syncretism

The analyses discussed thus far treat syncretism as the loss of morphosyntactic distinctions, using representations that disregard certain featural specifications in order to allow a morpheme to appear in a broader range of contexts. By contrast, a good deal of work in Optimality Theory (henceforth OT) has attempted to derive syncretism by imposing additional constraints on surface forms, forcing morphologically related forms to be partially or fully identical to one another. This might perhaps be used to gain a better understanding of the general tendency towards syncretic forms in language acquisition and change; see Morris (2005) for an application of McCarthy's (2005) theory of Optimal Paradigms to paradigm leveling in Old Spanish; and see also Wunderlich (2007) on the notion that polyfunctional affixes are more optimal than fully distinctive forms.

Similar to other theories of inflection, OT approaches to the phenomenon of syncretism come in two varieties. On the one hand, there are morpheme-based approaches, which assume that the relation between the form of an exponent and its feature specification is encoded as lexical entries (Grimshaw 2001, Trommer 2001, Wunderlich 2004, McCarthy 2005, Xu 2007, Müller 2008b). Patterns of syncretism may then be accounted for by a combination of underspecification and optimization procedures that select the form that can be realized in the insertion context with the least severe violations of a set of faithfulness constraints (cf. Grimshaw 2001, Trommer 2001, this volume, Wunderlich 2004), or an OT equivalent of rules of referral (Xu 2007). An alternative morpheme-based OT approach to syncretism is developed in Müller (2008b), who argues that the lexicon consists of an inventory of fully specified form-function pairings ("reading forms"), leaving a set of cells in the paradigm unfilled. These are then filled by an OT optimization that selects the leading form that can be fitted to the relevant context with as few feature modifications or deletions as possible.

On the other hand, there are a-morphematic approaches, in which the distribution of markers is fully determined by the workings of interacting violable constraints. These constraints may select exponents based on their phonological properties, or they may require (or penalize) certain pairings of exponents and grammatical categories/feature specifications. For example, Müller (2007) develops an analysis of bidirectional syncretism in which a phonologically motivated preference for the most sonorous exponent selects elements out of a pool of inflectional markers that are not specified for morphosyntactic features. (See also Müller, 2002, on determiner inflection in German, and Carstairs-McCarthy, 2007, on weak adjective and noun inflection in German.)

The most novel contribution of OT to the analysis of syncretism, however, is arguably not the mechanisms it provides for realizing morphological exponents given a set of morphosyntactic features. Rather, what distinguishes OT is that it allows the featurally expected exponents to be overridden by phonological considerations such as phonotactic well-formedness or the desire for related forms to resemble one another. Constraints which prefer inflectionally related forms to be uniform have been given various names in the literature, including UNIFORM EXPONENTE or PARADIGM UNIFORMITY (cf., e.g., Kenstowicz 1997, Steriade 2000). A particularly ambitious application of this type of constraint interaction can be seen in the attempt to integrate the analysis of morphological and phonological neutralization, using constraints that demand phonological identity. In what follows, we will discuss a proposal put forward in McCarthy (2005) which deals with the availability of stem allomorphy and its connection to formal properties of the set of inflectional affixes that attach to the stem.

**7.2.4.1 Optimal paradigms (McCarthy 2005)** McCarthy (2005) develops an OT model of inflectional morphology that focuses on the traditional observation that there are surface resemblances between morphologically related words (i.e. words which belong to the same paradigm). In OT, surface identity can be modeled by invoking output-output correspondence constraints, which demand faithfulness between independently occurring surface forms (cf., e.g., Kenstowicz 1997, McCarthy 2005, Benua 1997, 2000, Burzio 2005). In McCarthy's (2005) Optimal Paradigms (OP) model, it is assumed that the candidates subject to optimization consist of entire inflectional paradigms, where a traditional notion of 'paradigm' is presupposed ('an inflectional paradigm contains all and only the words based on a single lexeme'; p. 173). Identity or non-identity of exponent is then accounted for by assuming that there are correspondence relations between the candidate outputs ('every output realization of a lexeme stands in correspondence with every other output realization of that lexeme'; p. 171). As a result, output-output faithfulness constraints may interact with markedness and faithfulness constraints to override regular phonological processes, causing them to overlap in order to make the surface allomorphs more similar to one another than we would otherwise expect. Furthermore, McCarthy assumes that there are no bases in inflectional morphology. Instead, it is assumed that the phonological form of a certain combination of stem + inflectional affix can be determined only through simultaneous evaluation of all members of the inflectional paradigm, so that the outcome for one may influence the outcome for others through output-output faithfulness. Since output-output faithfulness constraints demand identity among related forms, this provides a strictly phonological mechanism for deriving syncretism (at least for the root/stem portion of the word).

An intriguing consequence of this phonological approach to identity is that certain facts may be analyzed as 'syncretism', even though they are not typically treated as such in morphologically-oriented approaches. McCarthy illustrates this with an analysis of Morpheme Structure Conditions, in which morphemes with a certain

phonological shape simply do not exist in the language. Specifically, he shows that constraints on the syllable structure of morphemes in Classical Arabic interact to require that lexical stems have a single, invariant shape, but with different consequences for nouns as opposed to verbs. In Classical Arabic, there are as many as fifteen different derivational classes for verbs, depending on how the root (typically consisting of a sequence of three consonants) is combined with a particular vocalic melody (signaling aspect and voice) and a stem template (i.e. a CVC pattern) which marks different conjugations such as causative (CVCCVC) or reciprocal (CV:CVC) (McCarthy 2005: 178ff., Bobaljik 2008: 36). Illustrative examples are given in Table 7.9.

In addition, there is an asymmetry between nouns and verbs with respect to the set of possible stem templates. While verb stems uniformly end in CVC] (i.e. there is no verbal stem template that ends in CV:C] or CVCC]), noun stems exhibit more variation with respect to the structure of their right edge: despite the fact that there are fewer noun stem templates than verb stem templates, the former exhibit a richer array of prosodic patterns (in particular, they may end in CVC], CV:C], or CVCC]). McCarthy observes that there seems to be a correlation between the set of permissible syllable structures at the right edge of stems and phonological properties of the inventory of inflectional suffixes that attach to the stem: specifically, all nominal inflectional suffixes begin with a vowel, while the set of inflectional suffixes which attach to verbal stems includes both V-initial and C-initial morphemes (see McCarthy 2005: 179f. for details). This observation is then taken to motivate an OP approach in which the templatic differences between nouns and verbs are directly attributed to phonological differences concerning the sets of affixes that attach to noun stems and verb stems, respectively. In particular, McCarthy proposes a set of output-output faithfulness constraints that demand that stems exhibit a non-alternating, constant phonological shape throughout the paradigm. However, as already noted above, in contrast to related proposals (cf. Kenstowicz 1997, Burzio 1996, 2005, Steriade 2000), McCarthy assumes that the input to the relevant OP constraints consists of entire paradigms, and not of individual forms. The optimal candidates are then those stem forms/paradigms that can combine freely with the relevant sets of inflectional markers without incurring markedness violations. A combination of OP constraints and common markedness constraints then ensures that verb stems, which must combine

Table 7.9. Templates and prosodic morphology: Classical Arabic *k-t-b* 'write', conjugations I-IV

	PERFECTIVE			IMPERFECTIVE		
	ACTIVE	PASSIVE		ACTIVE	PASSIVE	
I	katab	kutib		aktub	uktab	
II (CAUSATIVE)	kattab	kuttib		ukattib	ukattab	
III (RECIPROCAL)	kaatab	kuutib		ukaatib	ukaatab	
IV (CAUSATIVE)	?aktab	?uktib		u?aktib	?aktab	

with a larger set of more diverse suffixes, can only end in CV[C], while noun stems may exhibit more variation in their shape, due to the fact that they need only combine with suffixes that start with a vowel.

McCarthy illustrates this approach with the root *f-ʕ-l* 'do', assuming that under the common OT hypothesis concerning richness of the base (Prince and Smolensky 1993, McCarthy 2002) it is expected "that the lexicon supplies verb stems that are as diverse as noun stems" (McCarthy 2002: 180). As a result, there are hypothetical verb stems such as *faʕal* or *faʕalk* alongside the actual verb stem *faʕal*. McCarthy then considers a selection of candidate paradigms derived from a hypothetical verb stem with a long vowel in the final syllable, *faʕa:l*, focusing on the following possibilities (p. 181):

- | (17) Candidate Paradigm      | Remarks   |
|------------------------------|---|
| a. < faʕa:la, faʕaltu, ... > | The form <i>faʕa:ltu</i> is phonotactically bad because of the medial superheavy syllable <i>ʕa:l</i> . The paradigm has closed-syllable shortening. It is phonotactically OK, but vowel length alternates within the paradigm. |
| b. < faʕa:la, faʕaltu, ... > | The paradigm has no vowel-length alternations and no phonotactic problems. But it is indistinguishable from the paradigm of <i>faʕal</i> .  |

In (17a), all forms of the paradigm preserve the long vowel of the input form. However, attachment of a C-initial suffix gives rise to forms with a superheavy medial syllable such as *\*faʕa:ltu* 'V+1SG-common', which is generally impossible in Arabic (note that no problems arise in cases where a V-initial suffix is added to the verb stem). In (17b), this defect is repaired by the application of a process of closed-syllable shortening, giving rise to forms that comply with the phonotactics of Arabic. However, this repair leads to intraparadigmatic alternation concerning the surface form of the verb stem (*faʕa:l* vs. *faʕal*), which is ruled out by an OP constraint OP-IDENT-WT demanding output faithfulness with respect to vowel length (i.e. vowel length must not alternate within a paradigm; cf. also Urbanczyk 1996). Finally, (17c) represents the winning candidate. The resulting paradigm is characterized by an apparent overapplication of closed-syllable shortening, which has also taken place in contexts (with V-initial suffixes) where there is no phonotactic motivation for that rule. As a result, the long vowel of the input form has completely disappeared in the surface forms—but this is precisely what we expect under a ranking which favors output–output faithfulness over input–output faithfulness (McCarthy 2005: 185).<sup>18</sup>

<sup>18</sup> The highly ranked markedness constraints \* $\mu\mu\mu\mu\sigma$  and \* $\text{App-}\sigma$  rule out syllable structures which are disallowed in Arabic: \* $\mu\mu\mu\mu\sigma$  prohibits trimoraic (superheavy) syllables while \* $\text{App-}\sigma$  "prohibits linking a coda consonant directly to the  $\sigma$  node as an appendix" (McCarthy 2005: 183).

(18) OP-IDENT-WT > IO-IDENT-WT

/faʕa:l/ + {a, tu, ...}	* $\mu\mu\mu\mu\sigma$	* $\text{App-}\sigma$	OP-Id-Wt	IO-Id-Wt
a. $\sigma$ < faʕa:la, faʕaltu, ... >				**
b. < faʕa:la, faʕal $\sigma$ tu, ... >	*!	*!		
c. < faʕa:la, faʕal $\mu$ tu, ... >	*!			
d. < faʕa:la, faʕaltu, ... >			*!	*

In contrast, no such effects can be observed with noun stems. Due to the fact that all relevant inflectional affixes are V-initial, a stem-final consonant can always be syllabified as an onset (of the suffix), and the highly ranked markedness constraints can be satisfied without requiring any repairs (i.e. closed-syllable shortening). Consequently, for nouns, further stem shapes (i.e. CV:C] or CVCC]) are possible in addition to CV[C].

The upshot of this analysis is that what appears to be a 'purely phonological' fact about Classical Arabic—namely, the non-occurrence of verb stems with certain prosodic shapes—turns out to be a byproduct of a requirement for syncretism (surface identity). An important additional prediction of the Optimal Paradigms approach that is worth highlighting here is that by allowing all members of the paradigm to determine the outcome, the OP approach also predicts the possibility of 'majority rules' effects, in which the choice for a given form depends on which allomorph occurs in more slots in the paradigm. McCarthy (2005) argues that such cases do occur, providing an example from Moroccan Arabic. In the affixal domain, such effects appear to be rare, if they are found at all. However, we must be cautious in interpreting this claim, since morphological analyses of inflectional systems are rarely devised with the possibility of having the morphological exponents partly determined, or even overruled by the phonology. In principle, majority rules effects could arise if there were multiple options available for realizing a particular combination of features. For example, the following set of morphemes provides two options that are compatible with the 2pl:

(19) Underspecified morphemes leave competition in 2pl:

[+HEARER]	↔	/-ba/
[+p]	↔	/-ka/

If morphology provided two alternatives for the 2pl, and a phonological output–output identity constraint demanded that all affixes have the same realization (where not inconsistent with the morphosyntactic specifications), then the fact that the suffix /-ka/ occurs in two other parts of the paradigm (1pl, 3pl) while /-ba/ occurs in only one other cell (2sg) could privilege the use of /-ka/.

In sum, output-output conditions and constraint interaction within Optimality Theory provide a potentially very different set of tools for analyzing syncretism in phonological, rather than morphological terms. It seems unlikely that all of the syncretism facts discussed in the preceding sections can be analyzed insightfully in terms of phonological identity conditions—for example, the 1p/3pl /-en/ syncretism of Standard German has no obvious phonological motivation. At the same time, output-output conditions appear to be quite useful in explaining facts such as the underapplication of coronal dissimilation in Swabian (cf. Hall and Scott 2007), or the lack of cluster-initial nouns in Classical Arabic. If both of these mechanisms prove to be necessary, it remains to be determined what the appropriate division of labor between them is in capturing the range of identity effects in morphological paradigms.

### 7.3 A typology of syncretism

In this section, we focus on typological aspects of the study of syncretism. This is meant to serve two purposes: first, we want to broaden our empirical basis by taking into account a larger data sample from a wider variety of languages. Second, we want to examine whether the inspection of more complex patterns of syncretism can sharpen our understanding of what properties an adequate theoretical approach to syncretism should have.

In traditional nineteenth-century linguistics, syncretism was often perceived as a (diachronic) deviation from the so-called 'agglutinative ideal' of a one-to-one relationship between form and function (cf., e.g., Mayerthaler 1981, Dressler 2003). However, upon closer inspection, it becomes clear that syncretism is a defining characteristic of inflectional systems, showing up virtually in any language that exhibits some amount of inflectional morphology (cf. Baerman et al. 2005), with case, person, gender, and number being the features that are most commonly affected by it. Syncretism seems to be most prevalent in highly synthetic languages (e.g. classical Indo-European, Slavic), while it is less frequently found in agglutinative languages such as Turkish (cf., e.g., Krámský 1976).

Further cross-linguistically valid tendencies concern the way features/feature values interact as triggers or factors conditioning syncretism (see Baerman et al. 2005 for a comprehensive overview). In particular, it appears that across languages, there is a close link between syncretism and markedness, in the sense that the greater the number of marked features in a relevant inflectional node, the greater the likelihood of syncretism (cf., e.g., Boeder 1976, Bybee 1985a, Fradkin 1991; see Baerman et al. 2005 for a wealth of relevant data). For example, it is well known that languages tend to signal fewer distinctions in the (marked) plural than in the (unmarked) singular. Relevant examples where a certain inflectional distinction fails to be marked in the plural include the realization of case (Russian *kniga* 'book-SG.NOM', *knigi* 'book-SG.ACC' vs. the sole plural form *knigi*), gender (3rd person pronouns across Germanic, e.g. English 3sg *he/she/it* vs. 3pl *they*), and person (so-called *Einheitsplural* 'common plural' in Low German and Alemannic verb inflection, where there is only a single plural formative for all persons (which are distinctly marked in the singular)); see also

§7.4.2 below). In addition, we can observe that certain combinations of cases or numbers are more likely to be affected by syncretism than others. For example, one widespread pattern of case syncretism collapses the core cases used to mark subject and object as in characteristic nominative/accusative syncretism affecting neuters in Indo-European: in Latin, nominative and accusative are collapsed in the neuter forms of adjectives (*bonus* 'good.NOM/ACC'), but distinct in masculine forms (*bonus* 'good.NOM' vs. *bonum* 'good.ACC'). Another common pattern involves syncretism of core and non-core cases (e.g. syncretic accusative/genitive forms in Slavic), while syncretism of non-core cases is less frequent and more idiosyncratic concerning particular cases involved. However, while there are some clear preferences concerning the contexts and features/feature values affected by syncretism, it seems that there are only few, if any, clear generalizations concerning what is possible and what is not (cf. Baerman et al. 2005). The fact that apparently almost anything goes in the realm of syncretism raises serious problems for approaches that assume feature systems/hierarchies which impose narrow restrictions on the set of possible natural classes (such as Harley and Ritter 2002b). As pointed out above, without independent evidence about which cases of syncretism are treated by speakers as systematic, we must be cautious about ruling out generally valid representations based on the occasional apparent exception. However, if we take the observed set of syncretisms at face value, a possible conclusion is that we should not attempt to impose tight restrictions on possible morphemes through strong universal constraints on feature values or feature combinations. Under this weaker approach, features do exist, but the feature system must be flexible enough to allow for language specific (or arbitrary) classes. In general, as pointed out by Müller (2008a: 200), if there is such a thing as universal principles of inflection (governing the range of possible syncretism in any-given system), then we must look for them in a more abstract domain—not in the primitives (i.e. possible features/feature values) themselves, but rather in the way these primitives underlying grammatical categories can be combined (e.g. by the computational procedures of grammar).

In this section, we will give a (non-exhaustive) overview of the different types of syncretism that can be found across the world's languages (cf. also Wunderlich this volume: §5.2 for a different classification of syncretism types), discussing a set of empirical generalizations that have been proposed in the literature, and pointing out some issues that certain, more intricate patterns such as directional syncretism and polarity effects raise for morphological theory. It is important to note from the outset that like all typological discussions, the classification of any individual case depends on the analysis that is assumed. Thus, for example, a 'polarity effect' (same marker for [+F-G] and [-F+G], but not [+F+G] or [-F-G]) is only a polarity effect if we have some mechanism for meaningfully relating the exponents of these two values; otherwise, it is simply accidental homophony.

An instructive example of different types of syncretism comes from the nominal declension of Old Irish (masculine o-stem nouns). Old Irish exhibits a rich system of nominal inflections, providing distinctions for five cases (nominative, accusative, genitive, dative, and vocative) and three numbers. Nonetheless, the inventory of distinctive forms does not exhaust the range of logically possible distinctions. Instead,

TABLE 7.10. Declension of Old Irish 'man' (O'Connell 1912: 28, Pokorny 1923: 77)

	SINGULAR	DUAL	PLURAL
NOM	fer	fer	fir
ACC	fer	fer	firu
GEN	fir	fer	fer
DAT	fuir	feruib	feruib
VOC	fir	fer	firu

we find only five different forms that are organized in an intricate pattern of various types of syncretisms. First, there is simple syncretism (a term adopted from Baerman et al. 2005), that is, identical forms realizing different cells of the paradigm which differ in a single value of a certain morphosyntactic feature. In Table 7.10, we find two instances of simple syncretism. On the one hand, the plural part of the paradigm displays an instance of simple case syncretism, where a single form (*firu*) is used to realize both accusative and vocative. On the other hand, we observe that the cells for dative dual and dative plural are merged (*feruib*), giving rise to an instance of number syncretism. In addition, we can observe a more intricate pattern of syncretism involving the forms *fir* (genitive/vocative singular and nominative plural) and *fer* (nominative/accusative singular, nominative/accusative/genitive/vocative dual, and genitive plural), which both serve to realize multiple (and conflicting) combinations of case and number features.

Following work by Jakobson (1936), simple syncretism is commonly accounted for by assuming that morphological exponents may be underspecified for a subset of the relevant morphosyntactic features/feature values (see also Bierwisch 1967 and §7.2.1 above). Systematic instances of syncretism can then be taken to reveal insights into the fine structure of underlying featural distinctions if it is further assumed that the feature specification of syncretic forms refers to natural classes that result from decomposing traditional morphosyntactic features like [nominative] or [2nd person] into more primitive features (e.g. nominative = [-governed, -oblique] in the system proposed by Bierwisch 1967: 246).<sup>19</sup> Thus, in the example at hand, syncretism of the accusative and vocative plural suggests that in addition to [+plural], the relevant form *firu* is specified for a natural class of primitive case feature values that sets apart accusative and vocative from all other cases. Assuming a syntax-based system of binary features [=subject], [±governed], and [±oblique], the relevant natural class can be defined as [-subject, -oblique] (Müller 2004b; see also Bierwisch 1967, Wiese 1999; see Blake 2001: 43 for an alternative (semantics-based) feature system where accusative and vocative share the features [-peripheral, -possessor]). In this way, syncretism which results from partial underspecification can be taken to reflect possible natural classes of morphosyntactic features. Additionally, syncretism may

<sup>19</sup> In other words—at least to some approximation—identity of form reflects identity of function (cf., e.g. Müller 2004b for some discussion).

be due to complete underspecification, giving rise to 'elsewhere' forms (e.g. the null person/number suffix in the verbal inflection of English, which occurs in all contexts except 3sg.prs.ind). However, while the notion of underspecification is able to model many (basic) instances of syncretism, providing us with valuable insights into the matching of form and function, there are some indications—as already noted above—that underspecification alone is not sufficient to capture the full breadth of the phenomenon in an adequate way.

First of all, the use of underspecification as an instrument of morphological analysis is highly contingent on the theory of feature structure that is adopted (i.e. the sets of possible natural classes). In particular, the set of predictions made concerning a class of possible syncretisms may vary greatly dependent on whether one assumes a flat feature structure, a certain type of feature hierarchy/geometry, or a set of cross-classifying binary features (cf., e.g. Baerman et al. 2005).

Second, an analysis in terms of underspecification of individual Vocabulary items treats syncretism as a lexical phenomenon. This raises an issue with respect to system-wide syncretisms such as identity of 1pl and 3pl in German verb inflection (see above), where a lexical account in terms of underspecification seems to miss an important generalization, namely that the same kind of syncretism is found across paradigms with different phonological exponents. Thus, it seems that system-defining syncretism should be modeled by other theoretical means such as impoverishment or rules of referral (see also §7.2.1 above).

Finally, and most importantly, there are certain complex patterns of syncretism that apparently cannot be described in terms of underspecification, suggesting that we need additional tools of analysis. To illustrate this, consider again the Old Irish paradigm in Table 7.10. Apart from the simple syncretisms that we have already identified above, there are two additional syncretic forms, *fir*, and *fer* which are part of more intricate patterns of syncretism. Both forms appear with different numbers (*fir* with singular and plural, *fer* with all three numbers) and cases (*fir* with the nominative (pl), genitive (sg) and vocative (sg); and *fer* with all cases except accusative). An approach in terms of underspecification faces a problem here since it is not clear how to collapse the relevant cells of the paradigm in any straightforward manner. Neither is it possible to account for the distribution of *fir* and *fer* by invoking complete underspecification since it is not possible that both forms represent the elsewhere case. The particular pattern that characterizes the distribution of *fir*, which occurs with one case in the plural (nominative) but with different cases in the singular (genitive and vocative), is commonly referred to as a polarity effect. Complex patterns of syncretism (in particular, polarity effects and directional syncretism; see below) are often considered a major challenge for an approach to syncretism which solely makes use of underspecification, since the relevant surface effects cannot be attributed to any plausible natural classes of morphosyntactic features. Instead, they have been considered evidence motivating additional theoretical machinery that is part of the morphological component, such as rules of referral (Zwicky 1985). Since such complex patterns of syncretism have been playing a dominant role in morphological theory in the last twenty years, we will now take a closer look at relevant phenomena



that cannot be handled by underspecification alone, focusing on polarity effects and directional syncretism.<sup>20</sup>

### 7.3.1 Polarity effects

Polarity effects, where a certain systematic "morphological opposition seems to reverse its function across environments" (Baerman 2007: 33; accordingly, relevant phenomena are sometimes also referred to as 'morphological reversal') are among the most peculiar patterns of syncretism that seem to elude a straightforward analysis in terms of natural classes (i.e. via collapsing different values of a particular feature); see, e.g. Béjar and Hall (1999), Baerman (2007), Baerman et al. (2005), Lahne (2007), and in particular de Lacy, and Wunderlich (both this volume).<sup>21</sup> A well-known example of polarity comes from Somali, where suffixed determiners come in two variants: the determiner /-ta/ is used in the context of feminine singular or masculine plural nouns, while /-ka/ attaches to feminine plural or masculine singular nouns (cf. Table 7.11).

Admittedly, examples of full polarity where we find a perfect mirror image of exponents realizing apparently contradictory feature values (which Lahne 2007 calls "chessboard distribution") are quite rare cross-linguistically (cf. Baerman et al. 2005: 104). More frequent are cases of what Baerman et al. (2005) call "partial polarity." Here, a single form is used to realize multiple conflicting feature values (involving non-adjacent cells in the paradigm). Crucially, the relevant examples lack a mirror-image form giving rise to the chessboard distribution characteristic of the Somali determiner system in Table 7.11, as is the case with syncretism of nominative plural

TABLE 7.11. Somali definite article (Saeed 1999: 112)

	SINGULAR	PLURAL
FEM	-ta	-ka
MASC	-ka	-ta

<sup>20</sup> Baerman et al. (2005) propose a finer-grained typology of different kinds of syncretism, distinguishing between simple syncretism, nested syncretism, contrary syncretism, polarity effects, and directional syncretism. The notion of nested syncretism refers to cases where one syncretism seems to be embedded by another one. A relevant example comes from Upper Sorbian, where the dative and the locative are syncretic in the singular, while in the plural we find syncretism of the dative, locative, and instrumental. Thus, it appears that the pattern of syncretism found in the singular is nested within the more general pattern found in the plural (Baerman et al. 2005: 14). Contrary syncretism describes multiple patterns of syncretism which are distributed over different paradigms, but never cooccur in one and the same paradigm. Baerman et al. (2005: 14f.) give an example from the Nilo-Saharan language Nuer, where some nouns exhibit syncretism of the genitive and locative, while others have syncretic nominative/genitive or nominative/locative forms. Crucially, the patterns of syncretism are mutually exclusive in each individual paradigm.

<sup>21</sup> The notion of 'polarity' goes back to Meinhof (1912: 19) who defines it as "Wenn also aus A unter gewissen Bedingungen B wird, so wird aus B unter denselben Bedingungen A." If A becomes B under certain conditions, B becomes A under the same conditions." See Hezron (1967: 184) for an alternative definition that captures the gist of Meinhof's original statement in somewhat more formal terms. See also Speiser (1938) for an early (critical) discussion of polarity effects.

TABLE 7.12. Hindi masculine (class II) noun stems (Arsenault 2007: 6)

	SINGULAR	PLURAL
NOM	ladk-aa	ladk-e
OBL	ladk-e	ladk-ō

and oblique singular forms in Hindi (Table 7.12); the Old Irish paradigm in Table 7.10 above is another relevant example.<sup>22</sup>

Baerman (2007) gives further examples of polarity effects from a wide range of genetically and typologically different languages including Estonian (partitive suffixes), Hebrew (gender marking), the Nilotic language Dholuo (voicing reversal affecting stem-final obstruents of plural nouns, e.g. *kidi* 'stone', *kit-e* 'stone-PL', *koti* 'coat', *kod-e* 'coat-PL', Tucker 1994, de Lacy, and Wunderlich, both this volume), the Oceanic language Nēhan (noun class and number marking on definite articles), the Uto-Aztecan language Tübatulabal (aspect marking on verbs), and the Mixtecan language Copala Trique (tense-aspect-mood morphology).<sup>23</sup> Thus, while polarity effects do not range among the most frequent morphological phenomena, they still seem to be an undeniable fact of language calling for an adequate (systematic) formal description (see, e.g., Baerman et al. 2005: 105ff., and in particular Baerman 2007; but see de Lacy, and Wunderlich, both this volume, for a critical evaluation).

As already pointed out above, polarity effects seem to pose a challenge to the notion that syncretism corresponds to natural classes (i.e. unique combinations of binary features). A possible solution that has been proposed in the literature is to re-establish natural classes by assuming that inflectional rules may refer to particular configurations of multiple feature values. One such proposal, which is linked to the notion of markedness, has been put forward by Serzisko (1982). According to Serzisko, the chessboard distribution of gender and number marking in Somali serves to signal markedness congruence, in the sense that forms in /k-/ are used when the markedness values of the underlying gender and number features are the same (either both unmarked, as in the case of masculine and singular, or both marked, i.e. feminine and plural), while /t-/ signals different markedness values of the relevant values for number and gender (see Béjar and Hall, 1999, for a related approach to polarity effects where relative markedness is defined in terms of the presence/absence of nodes in a

<sup>22</sup> Note that at least from a conceptual point of view, the suffix /-e/ does not lend itself to an analysis as the completely underspecified elsewhere case, since it serves to realize marked features such as plural and oblique case (in contrast to e.g. /-aa/ which appears in the context of nominative and singular).

<sup>23</sup> See Baerman et al. (2005) for further examples of polarity, including an in-depth analysis of polarity effects characterizing the paradigm of subject-person marking in the Cushitic language Dhaasanac (Tosco 2001), which is couched in the framework of Network Morphology (Corbett and Fraser 1993, Evans, Brown, and Corbett 2001). See Wunderlich (this volume) for number marking in the Gur language Dagaare, which involves reversed markers for singular and plural in different stem classes.

feature geometry). However, as pointed out by Baerman et al. (2005: 108ff.) it seems to be rather doubtful whether polarity effects can generally be analyzed in terms of (semantic) markedness.

Another formal possibility to capture polarity effects in terms of natural classes is the use of variables that relate to the  $\pm$  value of binary features (i.e.  $\alpha$ -notation or exchange rules; Chomsky and Halle 1968; see Noyer 1992, Fitzpatrick, Nevins, and Vaux 2004, Alexiadou and Müller 2005, for the use of  $\alpha$ -notation/exchange rules in morphology). The chessboard distribution of the Somali suffixed determiners can then be attributed to the following set of Vocabulary items, where the form in /t-/ is taken to be the marked exponent while the /k-/ variant is analyzed as the elsewhere form (cf. Béjar and Hall 1999, Lahne 2007):<sup>24</sup>

- (20) [ $\alpha$ fem,  $-\alpha$ pl]  $\leftrightarrow$  /-ta/  
elsewhere  $\leftrightarrow$  /-ka/

Polarity effects may also be described by other theoretical means such as impoverishment and rules of referral; compare the following rules to describe the distribution of the Somali definite article (cf. Lahne 2007: 3):<sup>25</sup>

- (21) a. *Impoverishment rule for the Somali definite article:*

[+fem, +pl] > [-fem, -pl] / [+art, +def] —

- b. *Rule of referral for the Somali definite article:*

Inflection marker [+fem, +pl]  $\rightarrow$  Inflection marker [-fem, -pl] / [+art, +def] —

However, it is fairly clear that the rules (21) are quite arbitrary, describing an accidental pattern that emerges under very specific circumstances. Thus, while in principle possible, an analysis of polarity in terms of impoverishment/rules of referral does not seem to be an adequate treatment of polarity effects if the latter are recognized as being systematic in nature.

To conclude, while the literature on polarity effects does include a number of proposals that can account for the phenomenon in some more or less technical way, it seems that we still lack a deeper theoretical understanding of the relevant processes. However, there are some indications that this is perhaps no coincidence, for it has

<sup>24</sup> Lahne (2007: 4) criticizes an account of polarity effects in terms of  $\alpha$ -notation by pointing out that after resolution of the variable,  $\alpha$ -notation 'turns out to be a mere notational variant for homonymous markers'.

(i) [+fem, -pl], [-fem, +pl]  $\leftrightarrow$  /-ta/

Lahne then develops an alternative approach in which polarity effects are analyzed as local repairs of paradigm structure that are effected by the interaction of two principles, *Discreteness of Environment* (forcing discrete marking of adjacent cells in a paradigm, which may prevent the insertion of an underspecified marker M<sub>1</sub>), and *Minimality* (stating that the feature specification of a marker M<sub>2</sub> that is inserted—instead of an underspecified exponent M<sub>1</sub>—to satisfy *Discreteness of Environment* may only be minimally distinct from the specification of M<sub>1</sub>). Cf. also Wunderlich (this volume: §5.7) for a related approach. It seems, however, that this approach leads to a potential conflict with the *Subset Principle* (Halle 1997), since the marker M<sub>2</sub>, which is inserted to carry out the repair, must be allowed to bear a feature specification which is not fully compatible with the feature content of the insertion site.

<sup>25</sup> Note that the impoverishment rule in (21a) makes use of the idea that impoverishment may transform features values into their unmarked, default values (Noyer 1998; see also note above).

repeatedly been called into question whether morphological polarity (as a result of a particular set of inflectional rules/processes) is really treated as systematic and linguistically significant by speakers. For example, Lecarme (2002) argues quite convincingly that the apparent polarity effects in Somali (cf. Table 7.11 above) are actually the result of the particular properties of plural formation in Somali (and possibly other Cushitic languages), which is analyzed as a derivational process. More specifically, plural suffixes are shown to be nominal categories with a fixed gender that overwrites the gender value of the nominal stem. As a result, the suffixed definite determiner in fact reflects the gender of the (derivational) plural suffix, giving rise to the impression of polarity effects with plural forms. This particular (lexical) analysis is supported by the fact that gender reversal is not fully systematic in Somali; that is, there are some plural morphemes (those of classes 3 and 4) which do not give rise to a polarity effect (see Wunderlich, this volume, for more details and discussion of Lecarme's analysis). Furthermore, other instances of apparent morphological polarity have been shown to be amenable to an analysis in terms of independently motivated morphophonological processes (cf. Wolf 2005, Bye 2006, Trommer 2008e, de Lacy this volume on voicing/devoicing patterns in Dholuo, van Oostendorp 2005a, on apparent paradigmatic polarity in Limburg Dutch; de Lacy this volume).

### 7.3.2 Directional syncretism

Another set of phenomena that is often taken as an indication that a proper treatment of syncretism requires special mechanisms in addition to underspecification is so-called directionality effects. The notion of directional syncretism is commonly used to describe a scenario where a phonological exponent that is associated with a certain paradigm cell (i.e. a specific set of feature values) seems to be taken over by another paradigm cell in a certain context. Above, we have already mentioned briefly a relevant example from German verb inflection, repeated here for convenience. Recall that in the present indicative of regular ('weak') verbs, 1sg and 3sg are distinct: while 1sg is marked by /(-ə)/ (overtly realized as schwa only in the context of 1sg prs, see above), 3sg is marked by /-t/. However, in the past tense (and subjunctive), 1sg and 3sg are homophonous.

So it appears that in a certain context (past tense), the phonological exponent which normally expresses 1sg is taken over by 3sg. Examples as in Table 7.13, where the take-over seems to go into only one direction (1sg  $\rightarrow$  3sg), are sometimes called unidirectional syncretism (Stump 2001). As already briefly noted, directionality effects

TABLE 7.13. Directionality effect (1sg  $\rightarrow$  3sg) in German

	PRESENT		PAST	
	SINGULAR	PLURAL	SINGULAR	PLURAL
1ST	Ø	-(-ə)n	Ø	-(-ə)n
2ND	-st	-t	-st	-t
3RD	-t	-(-ə)n	Ø	-(-ə)n

have inspired the notion that in addition to underspecification and standard rules of exponence, the morphological component makes available a set of special 'directional' rules stating that under certain conditions, the exponent of a set of feature values X is also used to realize another set of feature values Y (i.e. rules of referral; cf. Zwicky 1985, Stump 1993a, 2001). The pattern in Table 7.13 can then be attributed to a rule of referral which states that under certain conditions (i.e. in the past tense of regular verbs), the exponent of 1sg is extended to 3sg contexts.<sup>26</sup>

However, as illustrated above for German, it becomes clear on closer inspection that many instances of unidirectional syncretism can also be captured without the use of rules of referral, making use of feature decomposition (giving rise to a more fine-grained system of natural classes) and an additional mechanism leading to zero exponence of certain feature combinations under the appropriate conditions (e.g. impoverishment rules; cf. section 7.2.2 above, and Frampton 2002, Nevins 2003, Trommer 2005c).

Still, it seems that not all instances of directional syncretism can be straightforwardly handled in this way. Stump (2001) identifies another type of syncretism which he labels bidirectional syncretism. In cases of bidirectional syncretism, there are two take-overs which move in two (opposite) directions.<sup>27</sup> Baerman et al. (2005) distinguish between two types of bidirectional syncretism, convergent bidirectional syncretism and divergent bidirectional syncretism. Baerman et al. (p. 136) describe convergent bidirectional syncretism as a pattern in which "there is a feature value *x* which takes the form associated with feature value *y* in some contexts, and in other contexts takes the form associated with feature value *z*." A clear example of convergent bidirectional syncretism comes from the Mongolic language Bonan (Todaeva 1997; see also Baerman et al. 2005: 136ff. for discussion). As shown in Table 7.14, the accusative is syncretic with the genitive in nouns, while in pronouns the accusative is syncretic with the dative/locative. Moreover, it appears that the accusative of nouns takes the form which 'properly belongs' to the genitive, while in pronouns the accusative represents a take-over from the dative/locative.

<sup>26</sup> Historically, directionality effects often arise as the result of analogical change extending the domain of one marker (Baerman et al. 2005: 70ff.). For example, it is commonly assumed that in the Old Icelandic present indicative, the 2sg marker *-ar* has been extended to 3sg (where the expected inherited ending would be *-þ*) on the model of verbs in *-n* and *-i*, where 2sg and 3sg fell together due to independent phonological changes (Kurylowicz 1947, Haugen 1982). Alternatively, the pattern characteristic of directional syncretism may develop from grammaticalization processes slightly changing a system where the relevant forms were originally fully syncretic. Baerman et al. (2005: 74f.) mention an example from Nobiin, a descendant of Old Nubian. While Old Nubian exhibited regular syncretism of 2sg/3sg and 1pl/2pl in all verbal paradigms, 2sg and 2pl markers were innovated in Nobiin (in the indicative and negative paradigms), giving rise to the impression of directionality in those paradigms that were not affected by this change (the interrogative and the conditional, which in fact represent the original state of affairs).

<sup>27</sup> An additional type of syncretism singled out by Stump (2001) is so-called 'symmetrical syncretism' where the cells/feature values realized by the syncretic forms do not constitute a natural class. An intriguing example mentioned by Stump comes from the Papuan language Hua (Haiman 1980), where the forms of 1sg and 2pl verbs are always identical (in all moods). Stump argues that the Hua data is interesting for theoretical reasons since it cannot be captured properly by standard means such as underspecification or rules of referral. Instead he proposes an analysis in terms of "morphological metageneralizations" which express redundancies across classes of realization rules in Paradigm Function Morphology.

TABLE 7.14. Convergent bidirectional syncretism in Bonan (Todaeva 1997: 35)

	NOUN ('foliage')	PRONOUN ('he')
NOM	lab čoŋ-Ø	ndžan-Ø
GEN	lab čoŋ-ne	ndžan-ne
ACC	lab čoŋ-ne	ndžan-de
DAT/LOC	lab čoŋ-de	ndžan-de
ABL	lab čoŋ-se	ndžan-se
INS/COM	lab čoŋ-gale	ndžan-gale

In contrast, divergent bidirectional syncretism is exemplified by a pattern in which "there is a feature value *x* which takes the form associated with feature value *y* in some contexts, while in other contexts *y* takes the form associated with *x*" (Baerman et al. 2005: 139).<sup>28</sup> Baerman et al. illustrate this state of affairs with an example from the Latin second declension, where in the regular neuter inflection, the nominative is shaped on the model of the accusative, while in a small class of neuter noun stems (including *vulgus* 'crowd', *virus* 'poison', and *pelagus* 'sea'), it is the other way around, and the accusative takes over the form of the nominative.<sup>29</sup> This is illustrated in Table 7.15.

Bidirectional syncretism raises a problem for approaches in terms of standard rules of exponence + underspecification, since it is not clear how the distribution of the

<sup>28</sup> It is important to note that notions such as convergent vs. divergent bidirectional syncretism actually refer to modes of theoretical analysis and not to the empirical pattern itself. Thus, it seems that instances of convergent bidirectional syncretism can also be described as divergent. In the case of Bonan, for example, the pattern can also be analyzed as *divergently* bidirectional if *-ne* is treated as a nominal marker and *-de* as a pronominal one. From this perspective, the dative of nouns takes the dative form of pronouns, while in the genitive, pronouns take the relevant nominal form (we want to thank an anonymous reviewer for helping us to clarify that issue).

<sup>29</sup> In the kind of divergent bidirectional syncretism exhibited by Latin it seems that there is a systematic relationship between the two take-overs, in the sense that the domain of the second take-over (certain neuters) is a (proper) subset of the domain of the first take-over (neuters in general). As pointed out by Müller (2008a), this suggests an analysis in terms of Stump's (2001) *Bidirectional Referral Principle*, which establishes a link between two rules of referral by tying the existence of one rule to the existence of another rule with a complementary domain.

TABLE 7.15. Divergent bidirectional syncretism, Latin second declension (singular) (Baerman et al. 2005: 140)

	default neuter	default masculine	neuter nouns with acc. in <i>-us</i> 'crowd'
NOM	'war'	'slave'	
ACC	bell -um bell -um	serv -us serv -um	vulg -us vulg -us
GEN	bell -i	serv -i	vulg -i
DAT	bell -o	serv -o	vulg -o
ABL	bell -o	serv -o	vulg -o

relevant inflectional formatives can be described by referring to natural classes (cf. Baerman et al. 2005, Müller 2007). For example, a relevant analysis of the pattern exhibited by Bonan would have to assume that at least one of the relevant markers, say *-ne*, represents a natural class, while the other (*-de*) is a slightly less specified form the insertion of which is partially blocked by *-ne*. For the sake of the argument, we might propose that *-de* realizes both accusative and dative, with its insertion in the context accusative/nouns being blocked by the availability of the more specified form *-ne* which occurs in the contexts genitive/nouns, genitive/pronouns, and accusative/nouns (cf. Müller 2007). However, such an approach would be based on the assumption that the latter three contexts have a certain property in common which identifies them as a natural class. Inasmuch as it is unclear whether such a unifying property can be plausibly assumed, the standard account of syncretism faces a problem here.<sup>30</sup> Accordingly, bidirectional syncretism has been taken to suggest the necessity of directional rules, i.e. rules of referral (Stump 2001, Baerman et al. 2005). For example, Baerman et al. (2005: 137) suggest that the pattern found in Bonan can be captured by the following pair of rules of referral (see also Stump 2001 for a relevant treatment of Romanian verb inflection in the framework of Paradigm Function Morphology):

(22) a. ACC in nouns = GEN

b. ACC in pronouns = DAT/LOC

While the phenomenon of directional syncretism certainly raises issues for standard approaches in terms of underspecification, it is not entirely clear whether it represents clear-cut evidence in favor of rules of referral (cf., e.g., Zwicky 2000, Wunderlich 2004, Müller 2007, 2008b). In particular, several authors have argued that surface

<sup>30</sup> Alternative treatments include simply assuming that the distribution of *-de* and *-ne* represents an instance of accidental homonymy, or stipulating different rule orderings for nouns and pronouns (cf. Baerman et al. 2005 for discussion).

directionality effects can be captured without invoking rules of referral. For example, Zwicky (2000) argues that instances of apparent directional syncretism can be described by symmetrical rules alone, and therefore that rules of referral are superfluous and should be abandoned. Starting out from a different set of theoretical assumptions (Optimality Theory), Wunderlich (2004) argues that directional effects can be described by a system of ranked violable constraints that govern the way exponents are matched with bundles of morphosyntactic features. An alternative morphematic OT approach to (bi)directional syncretism based on the notion of 'leading forms' (see section 7.2.4 above) is developed in Müller (2008b) (see Müller, 2007, for an a-morphematic OT analysis of directionality effects).

### 7.3.3 The relation between syncretism and portmanteau expression

We conclude the discussion of typological properties of syncretism by mentioning an observation by Carstairs (1987: 109–14) concerning an interesting correlation between syncretism and fused or portmanteau expression of morphosyntactic features. Carstairs points out that in principle, several different kinds of syncretism are conceivable, distinguished by whether the syncretic affix realizes just one type of morphosyntactic feature (e.g. person or number), or whether it realizes multiple features simultaneously (portmanteau/fusion of person and number). This is illustrated in Table 7.16, which shows the effect of syncretism on two different hypothetical languages: one with fully distinct realization of person and number (in the sense that affixes *a, b, c* realize person and *pl* realizes plurality, so no person forms are sensitive to number), and one with fusional person/number affixes.

Carstairs points out that in an admittedly somewhat limited sample of thirty-three cases of syncretism that were deemed to be non-accidental, the overwhelming majority (26 out of 33 cases) involve portmanteau morphs, as in Table 7.16d. This tendency is also confirmed with a larger and more balanced sample by Baerman et al. (2005), though no numbers are given.

Why should syncretism preferentially target portmanteau morphs? Carstairs points out that some insight can be gotten by comparing the lists of Vocabulary items needed in each case against the corresponding non-syncretic language. In the case of independent realization (Table 7.16a. vs. c.), the same set of morphemes is needed in

TABLE 7.16. Some logically possible syncretisms

Fully distinct	Some logically possible syncretisms			
	a. Independent	b. Portmanteau	c. Independent	d. Portmanteau
X-a	X-a-pl	X-a	X-a	X-d
X-b	X-b-pl	X-b	X-b	X-e
X-c	X-c-pl	X-c	X-c	X-f
Syncretic				
	c. Independent		d. Portmanteau	
	X-a	X-a-pl	X-a	X-d
	X-b	X-c-pl	X-b	X-f
	X-c	X-c-pl	X-c	X-f

either case; all that has changed is that the distribution of the 3rd person affix /c/ is more restricted (3sg rather than 3rd person more generally), while the distribution of the 2nd person affix is more general (now the 2nd/3rd default). Thus, in terms of economy of lexical specifications, nothing is gained by the syncretism in Table 7.16c. Comparing the portmanteau languages (Table 7.16b, vs. d.), on the other hand, here we see a clear saving, since we have one less morpheme that needs to be memorized. The suggestion, therefore, is that syncretism may serve to reduce the number of morphemes/vocabulary items that are needed (see also section 7.4.2 below on the development of so-called *Einheitsplural* 'common plural' in Alemannic).<sup>31</sup>

This hypothesis also bears a clear relation to the possible historical origins of syncretism. Although the role of economy in motivating diachronic change will be discussed in greater detail in section 7.4, we may also briefly consider the learning challenges posed by the languages in Table 7.16a. and 7.16b. Consider a learner of the language in Table 7.16a., at a stage in which the 2pl /X-b-pl/ has not yet been encountered sufficiently often to learn its form by rote memorization. In this case, there are two plausible analyses for the forms that have been encountered: either that /b/ is 2nd person ([+HEARER]) and /c/ is 3rd person ([-SPEAKER, -HEARER]) (as in the original language) or that /-b/ is 2sg ([+HEARER, -pl]) and /-c/ is the default [-SPEAKER] form.<sup>32</sup> Both specifications would be more general than the observed distributions: /b/ has been heard for 2sg ([+HEARER, -pl]) but would be assumed to occur in 2nd person ([+HEARER]); contexts more generally, while /c/ has been heard only in 3rd person ([-SPEAKER, -HEARER]) contexts, but would be assumed to occur in both 2nd and 3rd person contexts ([-SPEAKER]). The former choice, in which the suffix /b/ is underspecified for number, is fully parallel to the otherwise observable 1sg/1pl and 3sg/3pl identities. In this case, the 'system-congruous' pattern is that each morpheme is specified for a single feature, rather than letting one morpheme be doubly specified and leaving the other unspecified. There are two possible sources of this preference: either a general preference for morphemes to express single feature values, or a systemic preference based on the fact that this analysis allows all three persons to be marked with their own morpheme. Crucially, such a preference would favor the retention of patterns such as Table 7.16a, and disfavor the creation of syncretisms such as Table 7.16b.

Comparing Table 7.16c, we find that in this case, a learner who lacks evidence about the 2pl would not have any way to recover the original system, since the portmanteau suffix /e/ has not been encountered yet at all. Assuming that economy favors underspecification where possible, the learner of this language is free to posit that one of the known suffixes is underspecified, and is therefore eligible to fill the 2pl slot. Table 7.16d could be interpreted as the outcome of a scenario in which the 3pl suffix /f/ was assumed to be underspecified ([-SPEAKER, +pl], or perhaps just [+pl], or even

<sup>31</sup> Carstairs-McCarthy (1998a) refines and recasts this interpretation with a different definition of economy; we discuss here the earlier definition in order to highlight its relevance to theories that rely on degree of specification to derive syncretic distributions.

<sup>32</sup> Naturally, the details of the hypothesized feature specifications and the comparison in terms of economy will differ depending on what assumptions one makes about feature binary and the appropriate set of person features.

elsewhere); other assumptions about underspecification might lead to different syncretisms. The upshot is that portmanteau realizations may have the effect of 'isolating' inferences about the feature specifications of each individual affix, making it more difficult to recover the original distribution.

Although this learning-based interpretation of the observed typological bias is necessarily somewhat speculative, the broader lesson is that different theories of syncretism make different predictions about possible learning errors and diachronic change. Underspecification, in particular, seems like a particularly promising approach to such changes, since it is quite plausible to imagine that incomplete learning may result in less specified representations. The particular example discussed here serves to show that this alone is probably not sufficient as an account of incomplete learning, however. In the next section, we consider in greater detail diachronic evidence concerning how syncretism appears to have arisen in some particular cases.

#### 7.4 Diachronic aspects

Originally, the term 'syncretism' was primarily used to refer to the historical collapse of forms that were formerly distinct (cf., e.g., Pott 1836, and Delbrück's 1907 comprehensive study of the diachronic merger of the dative, genitive, locative, and instrumental in the history of Germanic). In general, we can distinguish between two major historical pathways leading to syncretism. On the one hand, forms that were formerly distinct may fall together due to phonological changes. For example, in many Germanic languages, inflectional syncretism resulted from phonological erosion affecting unstressed final syllables. Thus, Old High German still exhibits distinct verb forms for the infinitive (e.g. *nēman* 'to take'), the 1pl.prs (*nēmumēs*, *nēmēm*) and the 3pl.prs (*nēmant*), which all fell together into a single form in the course of time (Modern German *nehmen*). On the other hand, the same outcome may be effected by morphosyntactic changes, a relevant example being the collapse of the dative and locative singular in the history of Proto-Indo-European (PIE), depicted in Table 7.17 (Buck 1933, Baerman et al. 2005: 5).

The merger of the dative and the locative cannot be attributed to phonological change, since the relevant forms should be distinct in o-stem and consonant-stem nouns given our knowledge of the systematic sound changes that led from PIE to

TABLE 7.17. Rise of dative/locative syncretism in Indo-European (Greek)

	Proto-Indo-European ⇒ Greek			
o-stem	DAT.SG	-ōi		-ōi
	LOC.SG	-oi, -ei		
consonant stem	DAT.SG	-ēi		-i
	LOC.SG	-i		

Ancient Greek. Nor is it possible to attribute the collapse of the forms to the complete loss of one of the two cases, since it can be shown that the forms found in Ancient Greek reflect properties of both the dative and the locative (the form found in the o-stems descends from the dative singular, while the form used in the consonant stems is clearly a reflex of the original locative singular). So we must conclude that in the history of Indo-European, the syncretism of dative and locative resulted from "some fundamental reanalysis of the system of morphosyntactic oppositions" (Baerman et al. 2005: 6).

In this section, we identify cross-linguistic pathways and properties of language change leading to syncretic forms. In addition, we illustrate different modes of analysis, highlighting major lines of thinking in diachronic morphology.

A highly influential idea going back at least to the work of Jakobson (1936) on primitive binary features underlying case distinctions is that the development of syncretism depends on the existence of some shared property concerning meaning or syntactic functions. For example, Luraghi (1987, 2000) argues that the diachronic merger of case distinctions in Indo-European languages can be attributed to overlapping meanings (e.g. a shared meaning 'location' as the basis of dative/locative syncretism in Ancient Greek; see also Serbat 1989) or syntactic functions (common peripheral syntactic function of dative-ablative-locative-instrumental as the basis of case syncretism in Germanic). In a similar vein, Calabrese (1998), discussing case syncretism in Latin and the further reduction of the case system across Romance, assumes that case syncretism implies that the relevant cases share a feature value. Calabrese further distinguishes between *absolute case syncretism*, which holds across all nominal classes and categories and *contextual syncretism*, which affects only certain classes or categories. While the latter is attributed to underspecification of individual lexical items, the former is represented by a system of hierarchically ordered Case restrictions, which ban certain combinations of primitive case features (e.g. the Case restriction \*[-source, +association] is taken to block the morphological realization of an independent instrumental case in Latin).<sup>33</sup> The subsequent loss of case distinctions characterizing many Romance languages is then analyzed in terms of the activation of Case restrictions, giving rise to new instances of absolute case syncretism.<sup>34</sup> In this way, the study of the historical development of syncretism can give clues as to whether features are hierarchically ordered and what the hierarchy should look like (see also Noyer 1992, Lakämper and Wunderlich 1998).

<sup>33</sup> Note that the gist of Calabrese's approach to morphological change in terms of the activation/deactivation of Case restrictions is quite similar to analyses modeling diachronic phenomena as the rise/loss of impoverishment rules (cf., e.g., Noyer 1992).

<sup>34</sup> As pointed out to us by an anonymous reviewer, one might object that the term 'absolute case syncretism' is actually a misnomer: if syncretism by definition involves a form that realizes distinct morphosyntactic feature combinations (see section 7.1 above), then feature combinations blocked by Case restrictions cannot give rise to (system-wide) syncretism, since banned combinations are completely absent from the grammatical system and thus cannot be realized by the insertion of (underspecified) phonological exponents.

That line of thinking is also related to the observation that certain (combinations of) feature values play a conspicuous role in historical processes giving rise to syncretic forms. On the one hand, it seems that certain feature combinations are more likely to be affected by syncretism than others. This observation is often linked to the notion of markedness, in the sense that diachronically, it is more likely that syncretism affects forms which realize (a set of) marked features (cf., e.g., Boeder 1976, Bybee 1985a).<sup>35</sup> On the other hand, we can observe that certain forms are more likely to prevail in processes of analogical change than others. For example, it is a traditional idea in historical linguistics that analogical change leading to syncretism typically expands the domain of unmarked phonological exponents (Kurylowicz 1947, Garrett 2008). Related works include Watkins (1962), who observes that 3sg is the default form which serves as a model for analogical change leading to paradigm leveling (loss of alternations), a change known as *Watkins' Law* (see also Bybee and Brewer 1980).<sup>36</sup> Baerman et al. (2005: 71) present an example from Livonian, where in the present indicative, the 3sg ending *-b* has been extended to 1sg (where the inherited form should be  $\emptyset < *-\eta$ ), apparently on the model of the preterite forms, where 1sg and 3sg fell together due to regular sound change. Furthermore, it appears that the observations concerning singular forms carry over to the plural part of the paradigm, where across languages, third person forms tend to prevail in cases where person distinctions have been collapsed. An instructive example of analogical changes extending the domain of a 3pl form comes from Alemannic varieties of German, where the 3pl marker turned into a general plural marker for all persons. The relevant historical developments are discussed in some more detail in section 7.4.2.

Of particular interest are examples where it seems that certain instances of syncretism develop in order to 'repair' another syncretism affecting featural distinctions which are in some sense more central to the system (e.g. in terms of Bybee's 1985a

<sup>35</sup> Considerations of markedness, albeit in a somewhat different form, also play an important role in functionalist approaches to morphological change such as Natural Morphology, where it is assumed that change preferably leads to a more 'natural', unmarked outcome with respect to criteria such as iconicity, morphosyntactic transparency, or an ideally bi-unique pairing of form and function (cf., e.g., Mayerthaler 1980, 1981, Wurzel 1984, Dressler et al. 1987, Boretzky et al. 1995, Dressler 2003).

<sup>36</sup> This is in line with the observation that across languages, there are many examples where 3sg is used as a default agreement ending in cases where no proper agreement controller is available (cf., e.g., Häiman and Benincà 1992, on various Rhaeto-Romance varieties, Sigurdsson 1996, on Icelandic, Roberts 1999, on Welsh). A nice example where the extension of the 3sg seems to depend on syntactic conditions comes from so-called agreement weakening in Dutch (Ackema and Neeleman 2003, 2004, Nevins this volume: §33). When a 2sg pronoun follows the finite verb in inversion contexts, the verb carries a zero ending. However, when the subject pronoun appears in preverbal position, the zero ending is replaced by /-t/, which is identical to the 3sg agreement marker:

- (i) a. Dageujks loop- $\emptyset$  jij meet een hondje over straat.  
daily walk-2SG you with a doggy over street  
b. Jij loop-t dageujks met een hondje over straat.  
you walk-2SG/3SG daily with a doggy over street

(Ackema and Neeleman 2004: 193)



relevance hierarchy).<sup>37</sup> A well-known example involving case distinctions comes from Russian, where syncretism of nominative and accusative has been eliminated by using the genitive marker for animate accusatives, giving rise to genitive-accusative syncretism (cf., e.g., Hamilton 1974, Klein 1983). Note that this particular scenario is not just an idiosyncratic fact from the history of Russian; rather we can observe that cross-linguistically, there is a clear tendency to maintain distinctive case marking for objects ranking high on the animacy hierarchy (cf. Baerman et al. 2005). Such preferences may promote changes keeping certain cases distinct even if this leads to syncretism of other cases.<sup>38</sup> Other studies seem to suggest that there is a cross-linguistic tendency to avoid number syncretism at the cost of introducing syncretism in other domains. Again, this preference is in line with a typological observation, namely that cross-linguistically, there is a clear tendency for number syncretism to collapse non-singular values, but keep singular and non-singular forms distinct (Corbett 2000, Baerman et al. 2005). For example, Mignot (1978) attributes the fact that in the Modern Romance languages, case syncretism is quite frequent, while number syncretism is rare, to a constraint against number syncretism that was already at work in Latin and triggered the reanalysis of objective case affixes as plural affixes (Kurylowicz 1947). Another relevant example comes from the history of plural marking on nouns in Dutch (Kürschner 2009). Old Dutch exhibits a system of number marking which signals gender distinctions. There are four declension classes: while the suffixes *-a/-i* and *-on* are used with masculine and feminine nouns, the plural of neuter nouns is formed by attaching either *-er* or a zero ending. However, the rise of the zero ending, which resulted from phonological erosion affecting unstressed (final) syllables, led to syncretism of nominative singular and nominative plural in many neuter nouns. In later stages of Dutch, this number syncretism has been eliminated via transferring all nouns with zero plural endings to other noun classes with overt plural suffixes (*/-e/* ~ *schwa* in Middle Dutch), leading to the loss of gender distinctions in plural forms. A similar effect can be seen in the history of Yiddish, where apocope of final *schwa* yielded singular ~ plural syncretism that was subsequently eliminated by 'restoring' overt plural marking—e.g. *veg* ~ *veg* 'way-SG/PL' acquired an additional plural affix (*veg* ~ *vegn*), and *rog* ~ *rog* 'day-SG/PL' acquired a vowel alternation marking the plural (*rog* ~ *tegn*) (King 1980). Similar developments can also be observed in Early Modern German, where the diminishing role of *-en* as a case suffix seems to be connected to the fact that it gained importance as a plural marker with feminine nouns (cf. Hotzenköcherle 1962, Suchsland 1969, Wegera 1987: 253ff., Ebert et al. 1993: 177f., Kürschner 2009).<sup>39</sup> Related conclusions can perhaps be

<sup>37</sup> An alternative pathway for resolving syncretism is grammaticalization processes, which typically provide new, more specified exponents replacing old, 'worn-out' forms (cf., e.g., Fuß 2005, on the historical development of verbal agreement marking in a variety of languages).

<sup>38</sup> Note that it seems that the relevant preferences may differ from language to language. For example, apart from pronominal forms, nominative and accusative have generally fallen together in Germanic. Luraghi (1987) attributes the latter development to a language-specific preference for distinguishing between core arguments (i.e. nominative and accusative) and other, peripheral syntactic functions.

<sup>39</sup> To be sure, there are many diachronic developments that lead to random patterns of syncretism which cannot be meaningfully related to any such 'repair' tendencies. For example, Lakämper and Wunderlich

drawn from the Alemannic data discussed in section 7.4.2, where it might be argued that person syncretism is accepted to avoid number syncretism.

In what follows, we explore whether it is possible to explain pathways of language change via attributing them to properties of first language acquisition. Focusing on two examples of paradigm leveling from Germanic (the loss of stem vowel alternations in the verbal inflection of various Germanic languages and the rise of the so-called *Einiheitsplural* in Alemannic), we argue that the rise of syncretic forms can be attributed to learning strategies that the child applies to the input he/she receives in case the linguistic evidence is ambiguous or not sufficient to trigger a certain property of the grammar. In particular, it is claimed that the acquisition of phonological exponents categories is shaped by (i) a strategy to select stem forms which signal phonemic contrasts in the most unambiguous way and (ii) a strategy which aims at minimizing the number of features/elements stored in the lexicon.

#### 7.4.1 Loss of verb stem allomorphy in Germanic

Analogical leveling expands the domain of more regular forms, replacing more specified/marked forms by less specified/marked elements. A typical example of analogical change comes from the loss of stem vowel alternations in the development of the English past tense forms, as shown in Table 7.18 for the verb 'to drink'.

In Old English, agreement distinctions in the past tense were not only marked by different agreement suffixes, but also by alternations of the verb's stem vowel. However, in the historical development of the relevant forms, the vowel changes were lost and *drank* surfaced as the only past tense form of the verb *drink* with the stem vowel

TABLE 7.18. Analogical leveling of stem vowel alternations in English past tense forms

	Old English past tense forms	Expected Modern English past tense forms	Actual Modern English past tense forms
1SG	dranc	drank	drank
2SG	drunce	drunk	drank
3SG	dranc	drank	drank
1PL	druncon	drunk	drank
2PL	druncon	drunk	drank
3PL	druncon	drunk	drank

(1998: 145) note that "[S]uch ambiguities may constitute a pressure for the system, but every change in the system to overcome those deficiencies may result in new deficiencies in other domains. One kind of syncretism may be resolved, while, simultaneously, another kind of syncretism is introduced." They illustrate this with the historical development of subject/object marking on verbs in various varieties of Quechua. For instance, in Ancash Quechua the 2p/1sg (i.e. a 2pl subject acting on a 1sg object) and 2/1pl markers are identical, while the markers for 2/1sg and 2/1pl are distinct. However, the distribution of syncretic forms is exactly the other way around in the related dialect of Potosí. Accordingly, it appears that we cannot attribute the diverging historical developments to a uniform set of preferences governing the pairing of form and function/meaning (see also Baerman et al. 2005 for further problematic examples).

/æ/ generalized to all person/number combinations. Thus we can observe the rise of what Baerman et al. (2005) term "non-inflectedness", where the verb fails to signal any inflectional distinctions whatsoever (apart from tense). However, while the loss of the person/number suffixes can presumably be attributed to phonological erosion, it is quite unlikely that the loss of stem vowel alternations is amenable to such an analysis since it is generally assumed that phonological erosion affected only non-stressed final syllables, but crucially not the verb stem in the history of English.

Similar changes affected the verb's stem vowel in the history of Yiddish present tense forms, where the 2nd and 3rd singular forms of 'to dig' and the plural forms of 'to know' have been changed to match the relevant verb stem found in the 1sg: cf. Table 7.19 (see Albright 2002a for detailed discussion).<sup>40</sup>

From Table 7.19 it becomes clear that the process of analogical leveling led to the loss of agreement distinctions in the paradigm. In the case of *grɔbn* 'to dig', the change conflated the forms for 3sg and 2pl which were formerly distinct due to the existence of stem vowel alternation. Similarly, analogical leveling led to homophonous forms for 2sg and 2pl of *visn* 'to know'.

In approaches such as Natural Morphology, it is assumed that changes towards more uniformity within a paradigm are driven by general cognitive (semiotic) principles such as economy and (morphotactic) transparency (cf. Wurzel 2001, Dressler 2003, for relevant overviews), approaching the 'agglutinative ideal' where a single form corresponds to a single meaning/function (e.g. Wurzel's 1987 Principle of Uniformity and Transparency, or the Bi-uniqueness Principle, Dressler 2003; see also Mayerthaler 1981 and Leiss 1997 for discussion). Specifically, it is assumed that elemental meanings such as 'dig' or '[+HEARER]' should have a unique and invariant

TABLE 7.19. Analogical leveling of stem vowel alternations in Yiddish

	Present tense of <i>grɔbn</i> 'to dig'	Present tense of <i>visn</i> 'to know'
1SG	<i>grɔb</i>	<i>veys</i>
2SG	<i>grebst</i> → <i>grɔbst</i>	<i>veyst</i>
3SG	<i>grebt</i> → <i>grɔbt</i>	<i>veys(t)</i>
1PL	<i>grɔbn</i>	<i>visn</i> → <i>veysn</i>
2PL	<i>grɔbt</i>	<i>vist</i> → <i>veyst</i>
3PL	<i>grɔbn</i>	<i>visn</i> → <i>veysn</i>

<sup>40</sup> The stem vowel alternations that are etymologically expected in Yiddish verbal conjugation have different historical origins. With verbs such as *grɔbn* 'to dig' the vowel alternations were introduced by a phonological process (*Umlaut*) operative in Middle High German (note that Yiddish is assumed to have changed from this historical stage of German) which changed an *a* in the verb stem to an *ɛ* in the 2sg and 3sg, due to the presence of an /i/ in the suffixes of these forms (strong classes VI and VII). In contrast, vowel alternations between singular and plural forms (in the present tense) with verbs such as *visn* 'to know' are of a more ancient origin. Verbs such as *visn* are so-called preterite-presents the present tense of which derives from Proto-Indo-European perfect forms where stem vowel alternations distinguished between singular and plural (*Ablaut*).

exponent. Accordingly, learners/speakers tend to accept a change eliminating stem alternations in a given paradigm, in particular in cases where the relevant morphosyntactic distinctions are already encoded by other (more transparent/iconic) means such as suffixation (as in the Yiddish example given in Table 7.19).<sup>41</sup> Relatedly, paradigm leveling may be viewed in Optimality Theory as the reranking of uniformity constraints above markedness constraints, perhaps in accordance with a high ranking in the initial state (McCarthy 1998, Hayes 2004). However, while such an account makes certain predictions concerning the likelihood of analogical leveling in general, it has not much to say about further specifics of the change. For example, it is left unclear which of the stem forms in Table 7.19 is more likely to gain a wider distribution, eventually driving the other form out of the grammar.

The latter question is taken up by Albright (2002a), who develops a restrictive theory of which stem forms may in principle be affected by analogical leveling. Assuming that the direction of analogical leveling is determined by the morphological structure that learners posit, Albright argues that learners scan the input for a 'maximally informative' base form, which allows them to generate the remaining (unknown) forms in the paradigm as accurately as possible. Albright defines the maximally informative verb base as the form that suffers the least serious phonological and morphological neutralizations—i.e. loss of (morpho-) phonemic contrasts in a certain stem form due to the affixation of inflectional material. He illustrates the effects of neutralization with the following example from Yiddish, shown in Table 7.20, where—similar to German or English—the suffixation of a marker consisting of voiceless obstruents requires that a root-final obstruent becomes voiceless as well. This phonological process leads to the neutralization of morphophonemic contrasts in the 2sg, 3sg, and 2pl, where it is not apparent from the affixed form whether the verb stem ends in an underlyingly voiced stop (as in *liben*) or voiceless stop (as in *zipen*).

Albright (2002a, 2010) argues that of all base forms of the present tense paradigm, the 1sg has a unique status in Yiddish since it is much less affected by phonological neutralization than all other base forms. For this reason, the 1sg form is more

TABLE 7.20. Neutralization due to voicing assimilation in Yiddish (present tense)

	<i>liben</i> 'to love'	<i>zipen</i> 'to sift'	<i>tʃepn</i> 'to mess with'
1SG	<i>lib</i>	<i>zip</i>	<i>tʃep</i>
2SG	<i>lipst</i>	<i>zipst</i>	<i>tʃepst</i>
3SG	<i>lipt</i>	<i>zipt</i>	<i>tʃepet</i>
1PL	<i>liben</i>	<i>zipen</i>	<i>tʃepn</i>
2PL	<i>lipt</i>	<i>zipt</i>	<i>tʃepet</i>
3PL	<i>liben</i>	<i>zipen</i>	<i>tʃepn</i>

<sup>41</sup> This raises a question concerning the loss of distinctive stem vowel alternations as for example in the history of English (cf. Table 7.18), where the relevant distinctions ([-HEARER]) were not additionally expressed by inflectional suffixes. From the perspective of Natural Morphology, one might speculate that this change is linked to the complete loss of agreement marking (apart from 3sg) in the Middle English/Early Modern English period.

informative than any other base form as far as phonemic distinctions are concerned and can therefore be considered the maximally informative base form. For example, in the case of *liben* 'to love', only the 1sg base form would serve to unambiguously differentiate the verb *lib-en* from another possible (but nonexisting) verb \**lip-en* ending in a voiceless obstruent, or \**lipa-n* ending in a schwa.

In addition, Albright proposes an algorithm by which learners select a single surface form as the base form of the verb when he/she acquires a given inflectional paradigm (the so-called *single surface base hypothesis*). In the case of Yiddish, the algorithm favors the 1sg, because it retains distinctive phonological properties of the verb in question (number of phonemes, voicing, etc.) as unambiguously as possible. This form captures most contrastive information about verb roots, but it does not exhibit certain properties, such as the fact that *gröbn* originally contained stem alternations in the 2/3sg. Since such forms cannot be predicted on the basis of the 1sg, it is hypothesized that they would need to be memorized as exceptions. Under these assumptions, analogical leveling comes about if for some reason the learner fails to store or retrieve the relevant forms. As a result, he/she will go on to use the over-regularized forms which will eventually replace the old irregular forms if the change gains a wider distribution in the community.<sup>42</sup> In Yiddish, this kind of analogical leveling affected the present tense paradigm, in which the 1sg allomorph replaced the allomorphs found in all other slots in the paradigm (see Table 7.19 above).

A related but somewhat different change involves cases where analogy does not level stem allomorphy, but rather, reduces the inventory of inflectional affixes so that an underspecified form gains a wider distribution in a paradigm. This can be illustrated with a change that affected the plural forms in the verbal agreement paradigm of many Alemannic dialects, to which we now turn.

#### 7.4.2 The rise of *Einheitsplural* in Alemannic

Most Alemannic dialects spoken in Switzerland and Southwest Germany exhibit a single syncretic plural agreement formative /-ə(n)t/, which does not signal any person distinctions—so-called *Einheitsplural* ('common plural'). Table 7.21 shows the full inventory of agreement affixes in the present indicative.

The suffix used in the *Einheitsplural* originated from the original 3pl *-ent* (via vowel reduction and, in some varieties, deletion of /n/). Its development is an instructive example of an analogical change which gradually expands the domain of a certain formative in a paradigm, leading to a loss of distinctive inflections. Table 7.22 gives a rough overview of the different historical stages that eventually led to the paradigm in Table 7.21.

The rise of the common plural began in the Old High German (OHG) period. As illustrated in the first column of Table 7.22, it was preceded by a series of other changes that affected the inventory of person/number markers:

- 2sg *-s* → *-st* via a reanalysis of the onset of the 2sg nominative clitic *thu* (cf., e.g., Brinkmann 1931, Braune and Reiffenstein 2004: 261)
- 1pl *-mēs* → *-ēn*, which is commonly analyzed as an analogical extension of the subjunctive 1pl *-(e)m*.
- 3sg *-it* → *-et* (*e* presumably = schwa) due to a general reduction of vowels in non-stressed (final) syllables

The last of these changes, which is first attested in the works of Otfrid (mid-ninth century), led to the (partial) syncretism of 3sg with 2pl, discussed in section 7.2 above.<sup>43</sup> Starting out from the resulting inventory of person/number markers, the development of a 'common plural' proceeded via two major stages, illustrated in the second and third column of Table 7.22 (cf. Braune and Reiffenstein 2004: 263, Paul 1998: 240, and in particular Weinhöhl 1963: 332ff., Schirmunski 1962: 521ff., Besch 1967: 310ff.): In a first change, the 2pl ending *-it* replaced the former 2pl *-t*. The earliest instances of 2pl *-it* are attested in the Paris and St. Gallen manuscripts of the glossary of Abrogans (ninth-century OHG). All of these early prenasalized 2pl forms are used to render Latin imperatives: *haffent* (Paris ms., transl. of Lat. *extollite*), *dannent* (Paris ms., transl. of Lat. *extendite*); *firriemant* (St. Gallen, transl. of Lat.

TABLE 7.21. *Einheitsplural* in Alemannic (present indicative)

1SG	-ə
2SG	-f
3SG	-t
1PL	-ə(n)t
2PL	-ə(n)t
3PL	-ə(n)t

TABLE 7.22. The development of *Einheitsplural* (prs. ind. strong verbs and weak verbs of class I)

	Early OHG (around 900)	OHG/Notker (10th-11th century)	MHG/Alem. (13th-15th cent.)
1SG	-u	-o	-e(n)
2SG	-is → -ist	-est	-e](t)
3SG	-it → -et	-et	-(e)t
1PL	-mēs → -ēn	-ēn	-ent
2PL	-et	-ent	-ent
3PL	-ent	-ent	-ent

42. To be sure, further questions arise concerning the diffusion of analogical leveling in a speaker community. However, these issues are orthogonal to Albright's overall approach, which is not primarily concerned with sociolinguistic matters such as diffusion, but rather deals with the linguistic question of which forms may be affected by analogical leveling.

43. In some Bavarian varieties, syncretism of 3sg with 2pl was eliminated by a reanalysis of the 2pl subject clitic *-(e)z*, which gave rise to a new verbal agreement marker 2pl /-ts/ (cf. Wiesinger 1989, Weiß 1998, Fuß 2005).

*intelligite*), cf. Steinmeyer and Eduard (1879: 130f.). Thus, it appears that for reasons that remain unclear (but see note 45 below for some speculations), 3pl forms came to be used as plural imperatives. This innovation is mostly confined to Alemannic varieties of OHG, although there are also some relevant examples in the OHG *Tatian* (in particular in passages attributed to scribe  $\gamma$ , who is often considered to be an Alemannic speaker; cf., e.g., Sievers 1961; but see Moulton 1944 for a differing view). Consider the following example, where the prenasalized variant is used to render a 2pl imperative while the following 2pl indicative forms exhibit the original ending /-t/:

- (23) *infahent* then heilagon geist: then ir forlazet sunta,  
 receive-2PL.IMP the holy ghost those you.PL forgive-2PL.IND sins  
 then uuerdent sio forlazono, inñ then ir sio bihabet,  
 those will-be they forgiven and those you.PL them retain-2PL.IND  
 bihabeto sint.  
 retained are

Lat. *Accipite Spiritum sanctum; quorum remisistis peccata, remittuntur eis, et quorum retinueritis, retenta sunt.*

'Receive the holy spirit. If you [pl] forgive the sins of any, they are forgiven them; if you [pl] retain the sins of any, they are retained.'

(*Tatian*, 232,6)

At least in the *Tatian*, there is evidence that the extension to indicative forms first affected strong verbs and preterite-presents (cf. Moulton 1944: 331). In the work of Notker (Alemannic OHG, 950–1022), the new 2pl formative is found consistently in all tenses and moods. Then, in the Middle High German (MHG) period, *-nt* spread to 1pl (formerly *-en*), leading to the complete loss of person distinctions in the plural part of the verbal agreement paradigm.

Traditionally, the rise of the common plural is analyzed as an analogical change extending the domain of the 3pl ending (cf., e.g., Weinhold 1863, Braune and Reiffenstein 2004: 263).<sup>44</sup> Fuß (2010) offers an alternative explanation, in which the relevant changes were triggered by an acquisition strategy that aims to minimize the number of elements/features mentioned in the lexicon, which, as a side-effect, led to a more transparent relation between form and function/meaning.

**7.4.2.1 Extension of 3pl -ent to 2pl** Table 7.23 lists the forms of the verbal agreement paradigm of OHG before and after the extension of 3pl to 2pl. Note that /e/ is merely a theme vowel, which is presumably realized as schwa, at least in later stages of German.

Fuß (2010) argues that the extension of 3pl /nt/ to 2pl was part of a major reanalysis that affected the form-function pairings in the verbal agreement paradigm of early Alemannic. The proposed analysis is based on feature decomposition (adopting a binary system of person features [ $\pm$ SPEAKER] and [ $\pm$ HEARER]) and morphological

<sup>44</sup> One might argue that an opposite analogical change from 2pl to 3pl was blocked since it would have given rise to a number syncretism (3sg/3pl /-et/). As already noted above, it seems that cross-linguistically, there is a preference to maintain number distinctions at the cost of introducing other kinds of syncretism (e.g. affecting person distinctions).

TABLE 7.23. 2pl /-et/  $\rightarrow$  /-ent/ (prs.ind) in OHG/Early Alemannic (Notker)

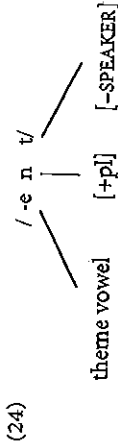
	Paradigm after conflation of 3sg, 2pl	Paradigm after reanalysis
1SG	-o	-o
2SG	-est	-est
3SG	-et	-et
1PL	-en	-en
2PL	-ent	-ent
3PL	-ent	-ent

subanalysis, where the inflectional markers listed in Table 7.23 are split up into smaller units of exponence (cf., e.g., Müller 2006a, b on German). Under these assumptions, the extension of 3pl /nt/ to 2pl can be analyzed as the result of two separate changes.

First, it is assumed that the earlier innovation of 2sg *-st* (inherited ending /-s/ + onset of subject clitic *thu*) made available a reanalysis of the segment /t/ as a realization of the feature [ $-$ SPEAKER], since final /t/ appears in all 2nd and 3rd person forms (cf. Table 7.23). In an additional change, the prenasalized plural imperative formative /-nt/ (presumably originating from 3pl, see above) was extended to all 2pl contexts (/t/  $\rightarrow$  /nt/).<sup>45</sup> Note that after this extension leading to nasalization of all 2pl forms, the segment /n/ could be analyzed as being uniquely paired with the inflectional feature [+pl], since it occurs in all plural forms and nowhere else. The result of these changes is illustrated in (24), where the inflectional marker /-ent/ is analyzed as a combination of smaller phonological exponents.<sup>46</sup>

<sup>45</sup> This leaves us with the question of why 3pl forms came to be used as plural imperatives in the first place. Since this change predates our earliest written records, we can only offer some speculations as to what factors might have promoted the nasalization of /t/ in imperatives. Weinhold (1863) observes that nasalization seems to be a common strategy across Alemannic to reinforce/strengthen inflectional formatives. Another relevant example comes from the past endings of weak verbs such as *lieb-ent-ent* 'live-past-3pl' or *erwach-ent-ent* 'awake-past-3pl' (Weinhold 1863: 361), where a homorganic nasal was added to the original dental suffix (see Ohala 1983, 1995, and Solé 2009 for discussion of other cases of 'spontaneous nasalization' across the world's languages). However, as pointed out by an anonymous reviewer, this raises the question of why this strategy affected 2pl imperatives, but not other forms such as 3sg (although one might argue that this option was blocked because it would have obliterated the number opposition between 3sg and 3pl). Another potential avenue one might pursue is to assume that the extended, prenasalized form was coined in analogy to the difference between long and short agreement endings found in 1pl contexts, where the long form *-mēs* occurs in inversion contexts with empty subjects (a configuration similar to imperatives), while the short variant *-en* is found elsewhere.

<sup>46</sup> A decomposition analysis requires that the relevant inflectional head may split up into several insertion sites prior to the insertion of phonological exponents ('Fission'; cf. Noyer 1992). Assuming that Vocabulary Insertion discharges features of the underlying morpheme, exponents compatible with the (remaining) feature set may be inserted as long as there are features left that can be discharged. See Müller (2006b, c) for a related analysis of the verbal inflection of Standard German.



Thus, it appears that widening the scope of the prenasalized marker /-nt/ to all tenses and moods gave rise to a more transparent relationship between form and function/meaning via creating a phonological exponent which was uniquely paired with the feature [+p] (compare the shaded line in Table 7.24).

The development of the new 2pl marker seems to be in line with functionalist notions such as the Bi-uniqueness Principle of Dressler (2003) and conditions on morphological change proposed in Mayerthaler (1980, 1981) or Wurzel (1987). According to Fuß (2010), however, the very same effect can be modeled in purely formal terms if we assume that the acquisition of phonological exponents and their feature specifications is subject to the following constraint (cf. Halle 1997: 430; see Calabrese, 1998: 93, for related considerations; see also section 7.3.3 above):<sup>47</sup>

(25) *Minimize Feature Content*

The number of features mentioned in the Vocabulary [i.e. in the lexicon] must be minimized.

The principle in (25) requires that learners acquire the most economical lexical inventory that is compatible with the input they are exposed to. This has the following two consequences for the acquisition of phonological exponents and their featural properties. First, the set of lexical entries/Vocabulary items stored in the lexicon consists of the minimal number of formatives required for generating the input. Second, each inflectional marker is associated with the most economical feature specification compatible with the input data. In other words, the learner acquires the minimal set of feature specifications that is necessary for deriving the distribution of a given phonological exponent/Vocabulary item.

Under these assumptions, we can devise the following scenario for the rise of the new synthetic 2pl/3pl formative. Assuming that nasalization of 2pl imperatives led to

TABLE 7.24. Reanalysis giving rise to 2pl /-ent/, OHG/Alemannic

Old feature specification	Exponent	New feature specification
[+SPEAKER, -pl]	/-o/	[+SPEAKER, -pl]
[+HEARER, -pl]	/-s/	[+HEARER, -pl]
[+SPEAKER]	/-t/	[+SPEAKER]
[-SPEAKER]	/-t/	[-SPEAKER]

47 Further support for a principle such as (25) comes from psycholinguistic experiments reported on in Clahsen, Eisenbeiss, Hädler, and Sonnenstuhl (2001), which suggest that more specified inflectional markers are more difficult to process than less specified forms.

variation in the input between 2pl /-et/ and /-ent/, the workings of (25) tipped the scales in favor of the more economical system of underlying feature specifications given in the last column of Table 7.24. As a result, learners 'grammaticalized' the reinforced form as new regular 2pl/3pl endings, leading to obsolescence of the old 2pl variant /-et/.

Note that as a side-effect, the desire for an economical inventory of exponents may also lead to a more transparent relation between form and function. In particular, if inflectional markers are decomposed into smaller units of exponence as in (24), selecting smaller units of exponence is more likely, inasmuch as it leads to a one-to-one relation between form and feature specifications. However, in contrast to functionalist accounts, this particular result is not attributed to a generation-spanning drift that pushes languages towards an 'agglutinative ideal'. Instead, the development of (more) transparent pairings of sound and meaning is treated as an (possible) outcome of the way individual learners assign feature specifications to phonological exponents (promoting the particular reanalyses that gave rise to (24)).

7.4.2.2 *The rise of a general plural marker: extension to 1pl* Between the thirteenth and fifteenth centuries, /-(e)nt/ evolved into the general plural marker for all persons, replacing 1pl /-(e)n/ (cf. Weinhold 1863: 366, Schirmunski 1962: 521ff., Besch 1967: 310ff., Paul 1998: 240). Table 7.25 lists the relevant forms (with theme vowels; /e/ = schwa).

The extension of /nt/ to the 1pl can be connected to two other changes that altered the make-up of the verbal agreement paradigm of Alemannic. There is reason to believe that the changes affecting the shape of the exponents of the 1sg and 2sg required a major reorganization of the form-function pairings in other parts of the paradigm. More precisely, what we can observe is that the extension of /-nt/ to the 1pl was accompanied by the loss of final /-t/ in 2sg contexts (presumably due to phonological erosion) and nasalization of 1sg giving rise to a new 1sg exponent /-(e)n/.<sup>48</sup>

TABLE 7.25. 1pl /-en/ → /-ent/ (prs.ind) in MHG/Alemannic (~13th-15th century)

Old paradigm	New paradigm
1SG /-e/	/-e(n)/
2SG /-st/	/-st/
3SG /-t/	/-t/
1PL /-en/	/-ent/
2PL /-et/	/-ent/
3PL /-et/	/-ent/

48 2sg /-st/ → /-t/ after /-t/ in most varieties; cf. Weinhold (1863: 365), Schirmunski (1962: 520ff.), Weber (1987: 174). The nasalization of 1sg forms is traditionally analyzed as an extension of the relevant 1sg ending of the weak verbs of classes II and III; cf. Schirmunski (1962: 519). Thus, the new nasalized forms of class I are presumably the result of analogical extension. Alternatively, we might suppose that they were coined by adult speakers to reinforce/strengthen the original 1sg form, which consisted merely of a schwa (see also note 45).

Interestingly, it seems that there is a systematic connection between the three changes highlighted by shading in Table 7.25. First of all, we can observe that the phenomenon of 'common plural' is also a characteristic of Low German dialects: Western Low German dialects exhibit the form /-(ə)t/, while /-ən/ is the typical ending found in Eastern Low German dialects (cf. Schirmunski 1962: 543f. for details). Interestingly, many of these dialects also exhibit loss of final /-t/ in 2sg forms, similar to Alemannic (Schirmunski 1962: 544). Second, Besch (1967: 301) observes that there is a geographic connection between the extension of the *Einheitsplural* to 1pl and the presence of the 1sg form /-(e)n/, in the sense that in the fifteenth century, 1sg /-n/ is found in particular in those dialectal areas that also participated in the development of the *Einheitsplural*. Thus, we may conclude that the joint appearance of (i) the changes affecting the 1sg/2sg forms and (ii) the rise of the *Einheitsplural* is not coincidental.

First of all, note that due to the loss of final /-t/ in 2sg, /-t/ could no longer be analyzed as a marker realizing the feature [-SPEAKER]; otherwise, we would expect /-t/ to occur in all 2nd and 3rd person contexts. Thus it appears that this change not only affected the shape of 2sg forms, but also had a considerable impact on the whole system of feature distinctions that underlies the verbal agreement paradigm. In a similar vein, nasalization of 1sg leading to 1sg /-en/ not only altered the shape of 1sg forms, but also affected the system of form-function pairings in the plural part of the paradigm since /-n/ could no longer be paired with unique feature values, the /-nt/ suffix could no longer be decomposed. This would have favored analyzing /-nt/ as a realization of [-SPEAKER, +plural], which, under pressure to minimize feature content, could have been simplified and extended to all [+plural] contexts. With /-nt/ analyzed as a pure plural marker, /-t/ is freely analyzed as the elsewhere marker:<sup>49</sup>

- (26) a. [+SPEAKER] ↔ /-n/  
 b. [+HEARER] ↔ /-l/  
 c. [+pl] ↔ /-nt/  
 d. elsewhere ↔ /-t/

Furthermore, syncretism of all plural forms is a system-defining trait of the relevant Alemannic varieties, affecting all paradigms, including highly irregular suppletive conjugations as in the case of *sein* 'to be' (1pl/2pl/3pl *sind*; Cécile Meier p.c.). This suggests that we are observing a system-defining syncretism, similar to 1pl/3pl in the verb inflection of Standard German. This metasyncretism of the plural forms may be

<sup>49</sup> The extension of 2pl/3pl to 1pl was perhaps additionally promoted by the fact that nasalization of 1sg led to number syncretism of 1sg and 1pl, which seems to be generally dispreferred across languages (see above).

captured with an impoverishment rule that deletes person features in the context of [+pl].<sup>50</sup>

(27) *Impoverishment in Alemannic (Einheitsplural)*

[±SPEAKER], [±HEARER] → ∅ / [+pl]

Due to (27), there is no need to posit additional number specifications for the exponents that realize person features. Under the assumption that Vocabulary Insertion is subject to the Elsewhere Condition, the forms 1sg /-n/ and 2sg /-l/ cannot be inserted in plural contexts, since they contain features not present in the relevant inflectional morpheme after impoverishment has taken place. Thus, it appears that the rise of person syncretism in Alemannic led to a highly economical inventory of inflectional markers where each phonological exponent is uniquely paired with a single syntactico-semantic feature.<sup>51</sup>

A key feature of this account is that a bias for simpler representations may lead learners to posit maximally general, or perhaps even overly general (underspecified) representations for morphemes. An important area in need of further research is the formalization of how this learning bias can be embedded into an explicit theory of morphological learning. Pertsova (2007) provides a proposal in this direction, sketching an algorithm that discovers underspecified representations based on the occurrence of syncretism. We anticipate that implemented algorithms for learning—and perhaps also mislearning—morpheme distributions will be an important tool not only for understanding language change, but also for predicting which syncretisms speakers treat as systematic and significant.

## 7.5 Conclusion

In this chapter, we have provided a critical survey of current theoretical approaches to the phenomenon of syncretism, that is, mismatches between syntax and morphology where the morphology fails to mark a featural distinction that is syntactically relevant. We began this chapter by arguing that the distinction between coincidental and systematic patterns of syncretism is psychologically real. To support our case, we presented an overview of types of data showing that many cases of syncretism are systematic and merit linguistic analysis, including morphological, syntactic, and psycholinguistic evidence that speakers treat syncretism as linguistically significant.

<sup>50</sup> It seems likely that the development of an impoverishment rule was preceded by a gradual development leading to underspecification of individual lexical items. At some point, the series of analogical changes tipped the scales in favor of an reanalysis in terms of impoverishment which expresses highly systematic neutralizations (see Noyer 1992: lxxxii, for some discussion). Furthermore, since impoverishment typically leads to a reduction of features mentioned in the Vocabulary, we might also suppose that the rise of impoverishment is promoted by a principle such as *Minimize Feature Content*.

<sup>51</sup> Later (purely phonological) changes led to the present-day paradigm (cf. Table 7.21): (i) cluster reduction of /nt/ via elision of /n/ (cross-linguistically a common change, which is usually attributed to a tendency to preserve the least sonorous element of the target cluster; cf. Obala 1996, 1999, Pater 2003); (ii) loss of final /-n/ in 1sg forms (in most varieties).



In section 7.2, we then turned to the question of how best to analyze syncretism theoretically, comparing various mechanisms for handling identity between forms/exponents (in non-accidental patterns of syncretism) that have been proposed in the literature. The discussion of current formal models of syncretism was organized around a particular data set, focusing on properties of verbal inflection in German to illustrate different modes of analysis. First, we demonstrated that traditional approaches in terms of underspecification + blocking can successfully capture many cases of syncretism in a more or less straightforward way by making reference to natural classes based on combinations of morphosyntactic features. However, it also became clear that more complex patterns of syncretism call for more powerful analytical tools such as impoverishment or rules of referral. In addition, we showed that Optimality Theory offers an alternative view of syncretism, in which syncretic forms may be selected on phonological grounds, overriding the morphologically expected forms. We then took a closer view at one particular OT approach put forward by McCarthy (2005, Optimal Paradigms), where different exponents are constrained to look alike by output-output faithfulness constraints that require surface realizations (e.g. of stems) to be identical.

Section 7.3 served to review typological evidence concerning the features most frequently involved in syncretism, as well as common and not-so-common patterns of neutralization across the world's languages (single vs. multiple feature syncretism, polarity effects, directional syncretism, and the relationship between syncretism and portmanteau expression). In addition, we considered what factors characteristically trigger or condition syncretism. In particular, the discussion of typological aspects served to highlight strengths and weaknesses of the theoretical mechanisms introduced in section 7.2.

In section 7.4, we extended the empirical base against which theoretical models are tested by adding evidence from the history of languages. Here, we first gave a survey over cross-linguistically recurring patterns of language change that shape the historical development of inflectional paradigms. Based on a detailed discussion of the loss of stem alternations in Germanic and the rise of so-called *Einheitsplural* 'common plural' in the verbal agreement paradigm of Alemannic, we then argued that the relevant diachronic tendencies can be attributed to the workings of learning strategies that shape the acquisition of inflectional morphology.

## 8

Templatic and subtractive truncation<sup>1</sup>

BIRGIT ALBER AND SABINE ARNDT-LAPPE

## 8.1 Introduction

A large variety of processes has been discussed under the name of truncation in the morphological and phonological literature. In this chapter we discuss truncation as a form of morphological exponence, where a morphological category is realized through truncation. Given that the term 'truncation' refers to form rather than meaning, we begin this chapter with a definition of the formal side of truncatory processes.

The term 'truncation' is usually employed to refer to two different kinds of processes. Representative examples are given in (1) and (2).

- (1) Spanish hypocoristics  
(Piñeros 1998, 2000, Roca and Feliu 2003)
- | Base name | Hypocoristic | Preserved | Deleted |
|-----------|--------------|-----------|---------|
| Umberto   | Beto         | óσ        | σ       |
| Gilebardo | Balo         | óσ        | σσ      |
| Cristina  | Tina         | óσ        | σσσ     |

- (2) Koasati plurals, pattern I<sup>2</sup>  
(Martin 1988, Kimball 1983, 1991, Broadwell 1993, Lombardi and McCarthy 1991, Weeda 1992, data as in Horwood 2001)

Singular	Plural	Preserved	Deleted
pitáf-fi-n	pít-li-n	σ	VC
ataká-li-n	atak-li-n	σσ	VV
akocofót-li-n	akocóf-fi-n	σσσ	VC

The data in (1) exemplify one of several patterns that derive hypocoristic forms in Spanish (see Piñeros 1998, 2000, and references therein for an overview). The pattern

<sup>1</sup> For helpful comments on this chapter we want to thank audiences at Rutgers University, New Brunswick, UMAQ, Montreal, the GGS conference 2009 at Leipzig and, especially, Ingo Plag, Alan Prince, Jochen Trommer, and an anonymous reviewer.

<sup>2</sup> There is also a pattern II, which is not discussed in this introduction. Cf. section 8.3 for details.

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