1

Introduction: Approaching inflectional identity

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1.1 Overview

The topic of this volume is inflectional identity. We group together under the term *inflectional* the morphological markers that participate in a "paradigmatically-related" alternation to express case, person, number, gender, or class distinctions. *Identity* covers and classifies a range of identity and similarity relations among the phonological form of these items. We refer, informally, to any *n*-way classification of verbal or nominal inflection as a paradigm, where the two (or more) dimensions could be tense and agreement (on verbs) or conjugation class and case (on nouns).[1] The primary focus of study here will be on inflectional rather than derivational morphology (e.g., nominalization of verbs or the formation of the superlative form of an adjective), as one of the key puzzles is identity-of-form among items that have no clear derivational history with respect to each other.

The overarching themes that emerge in the study of inflectional identity include questions of whether a set of inflectionally-related forms (e.g., all of the case endings within a certain declension class of nouns, or all of the singular stems for a certain conjugation class of verbs) share a common "base" from which identity of form can be understood to emerge, and questions of the division of labor between representational and derivational theories of the phonological form of closed-class morphemes.

Effects of the force of identity–in form and in patterning of phonological behavior of inflectional items–have been implicated in grammatical study for quite some time. While historical linguistics has made repeated appeal to such forces (analogy, leveling, functional analogy; see Paul 1880, for example), this

[1] See Williams (1981; 1994); Wunderlich (1996); Carstairs (1987); Stump (2001) for models in which paradigms and their organization play a central role.

kind of teleological reasoning was not easy to capture in SPE-style generative phonology (e.g., Chomsky and Halle 1968) because such models function in terms of rules with inputs and outputs applying to underlying and intermediate representations with no formal mechanism for talking about the result or the target, i.e., the structural descriptions of rules cannot look ahead, and must refer to input but not to what will be accomplished by output.

Authors such as Kenstowicz and Kisseberth (1977) and others have long noticed the appeal of teleological reasoning in the explanation of certain phonological patterns. One such case, discussed by Kenstowicz and Kisseberth (p. 153), is a morpheme structure constraint in the Nilotic language Alur. In this language CVC roots can have either two alveolar stops (e.g., tado, tato) or two interdental stops (e.g., ðeθo or θeðo) but not a mixture (e.g., *θedo or teðo). Setting up a rule that assimilates the place of the first stop to the second or vice-versa would impose directionality and asymmetric dependency, neither of which is motivated by the data. By contrast, a simple condition, or constraint (e.g., *[α anterior] V [$-\alpha$ anterior]) on the output offers a more concise and intuitive characterization of the generalization.

This work in the 1970s prepared the stage for the rise of output-based constraints, paradigm-level constraints, and eventually Optimality Theory. The OT formalism makes the expression of teleological explanation very easy. In addition, constraints can make reference to pairs or sets of derivationally-unrelated surface forms, unlike derivational rules. Thus, rather naturally this framework also brought about the attempt to capture paradigmatic regularity forces as the result of constraints on the form of paradigm members, often directionally imposed by a subset of forms in the paradigm (McCarthy 2005; Kenstowicz 1996; Steriade 1999; Downing et al. 2005).

Interestingly, however, Kenstowicz and Kisseberth also invoke, in the same era, another important issue for any attempt to capitalize on paradigmatic regularity as a form of explanation, namely the fact that the notion of paradigm itself often lacks an explicit definition and is often applied to a particular analysis in an intuitive or case-specific fashion. One of the important areas of research to which we hope this volume contributes is laying out formal demarcations of the sets of forms in which paradigmatic identity effects are predicted to apply.

In what follows, we will touch on a number of contemporary approaches to paradigm structure that have shaped linguistic theorizing since the emergence of generative phonology, i.e., the era beginning with the publication of Chomsky and Halle (1968) and continuing until today. A number of different answers have been put forward regarding the mechanisms underlying paradigmatic relations. While we will not attempt here to provide a comprehensive

survey of the field, we aim to highlight key aspects of approaches to inflectional identity. After illustrating what we believe to be two of the central issues in the study of inflectional identity, we turn to a discussion of the individual chapters of this volume within the context of a number of individual case studies chosen from the literature.

1.2 The identification of base of identity and scope of identity effects

In this section, we introduce two important general questions that should be pursued in explaining identity effects through the notion of paradigm. The first is the *asymmetry* question: why do inflectional identity effects go from some members in the paradigm towards others, and not vice versa? The second is the *inclusion* question: what is the set of relevant forms that learners put together into the set of inflectionally-related elements? These are two things a theory of paradigms should provide. In what follows we illustrate these two core questions with brief case studies.

1.2.1 *The asymmetry question*

When identity effects pull one morphological form *A* towards an unexpected phonological shape in order to look more like *B*, one question that logically arises is, why didn't *A* pull *B* towards it instead? As a case study, consider, for example, the factors governing Spanish diminutive allomorphy, as discussed in Kenstowicz (2005).[2] As a rough approximation, Spanish has two diminutive suffixes, *-it-* and *-cit-*, which are chosen allomorphically: *-cit-* follows nouns ending in a sonorant consonant, while *-it-* occurs elsewhere. Thus, the word *corona* 'crown (f.)' has the diminutive *coronita*, while the word *ratón* 'mouse (m.)' has the diminutive *ratoncito*. Now consider the word *ratona* 'mouse (f.)'. By the phonological conditions stated above, we expect the diminutive to be *ratonita*, in a manner entirely parallel to *coronita*. Nonetheless, it is *ratoncita*.

(1.1)	a.	corona	coronita	'crown (fem.)'
	b.	ratona	ratoncita,*ratonita	'mouse (fem.)'
	c.	ratón	ratoncito	'mouse (masc.)'

Kenstowicz's explanation is that the masculine and feminine forms of 'mouse' compose a paradigm, and thus *ratoncito* exerts pressure for identity on *ratoncita*. The immediate question arises about the directionality of this identity-yielding effect. Why couldn't things go the other way, i.e., why

[2] Earlier studies include Jaeggli (1980), Crowhurst (1992), Harris (1994), and Aguero-Bautista (1998).

couldn't the otherwise well-formed *ratonita* exert pressure on the masculine, yielding **ratonito*?[3] We dub this the *asymmetry* question.

In this particular case, an insight to the question might be found in an exploration of independent evidence from the theory of morphological markedness. It has often been observed that the behavior of the two genders masculine and feminine in Romance languages (and perhaps more generally) is not of equal status. In particular, masculine gender is more frequent in the lexicon in terms of types (there are more masculine roots than feminine), is represented more often in corpora in terms of token frequency, and is chosen as the default gender for adoption of new nouns. In addition, in languages with more complex case systems, one finds fewer overtly-marked case distinctions (i.e., more syncretism) for the feminine gender than for the masculine. All of these diagnostics point towards an unequal behavior of masculine and feminine genders in which masculine is less marked, i.e., more of the default or less "costly" than the feminine gender within this formal binary opposition (Greenberg 1966).

Returning to the Spanish diminutives case, we might understand the asymmetry, where the masculine exerts influence on the form of the feminine, as the result of a more widespread directionality. As masculine gender is unmarked in Spanish (e.g., Harris 1991), the asymmetry effect here may reflect a more general principle: unmarked forms affect marked forms, and not vice versa. Thus, the asymmetry question can in principle be resolved by explicitly identifying an asymmetric base of derivation, with the important desideratum being a general theory for identifying the base, presumably from independently deducible factors.

1.2.2 *The inclusion question*

In the common process in which a set of morphologically-related forms contains A,B,C,D,E,F, and only A,B,C,D participate in an identity effect, another question that arises is why E,F are not included in the identity effect. Consider, as an example, the phenomenon of Brazilian Portuguese (BP) stem readjustment in the plural, as discussed by Ferreira (2004). BP has a morphophonological rule that converts the liquid [l] into the vowel

[3] This example is expository in nature, and it would divert from the discussion in the text to provide an alternative analysis here. Briefly, a source of the difference between *coronita* and *ratoncita* lies in the fact that the former is inherently specified as an *-a* Class noun, while the latter only becomes part of the *-a* class by virtue of being the feminine counterpart of an animate noun (thus subject to Harris's (1991) "cloning rule"). If diminutive allomorph selection occurs before "gender cloning," then it will apply to the stems *corona* and *ratón*, yielding *coron(a)+ita* and *raton+cit*. Gendered cloning of animate nouns follows, yielding *ratoncito* and *ratoncita*. The "identity" effect would thus not be an asymmetric relation between masculine and feminine but rather would be between the gender-unspecified root and its suffired variants.

[i] before the plural suffix *-s*,[4] yielding alternations such as *jornal/jornais* ("newspaper" sg./pl.). The diminutive *-zinh(o)-* is added to such stems (with similar phonological conditions as Spanish, above), yielding the diminutive *jornalzinho* (notice that the [l]-to-[i] rule does not apply before [z]). Surprisingly, however, the plural diminutive is *jornaizinhos*, the result of the fact that the liquid-to-[i] rule has "overapplied" with no phonological environment to trigger it.[5]

(1.2)

	singular	plural	
a.	jornal	jornais	'newspaper'
b.	jornalzinho	jornaizinhos	diminutive
c.	jornalzão	jornalzões	augmentative

Overapplication occurs when a phonological process that is attested in a specific context in the language has applied in a case which did not contain the relevant context. In many cases, the context has been "destroyed" by another phonological or morphological process. In other cases, overapplication might occur in one member of the paradigm, due to the influence of other members of the same paradigm. Underapplication describes the inverse situation, where a phonological process fails to apply in a certain case that does exhibit the required context.

Ferreira's explanation for the overapplication of stem-readjustment in *jornaizinhos* is that the nondiminutive plural and the diminutive plural constitute a paradigm, and an identity effect demands identical stem realization in both forms. What remains mysterious is the fact that in the plural augmentative, *jornalzões*, this identity effect is not in force. Why should the noun and its diminutive form a paradigm to the exclusion of the augmentative? We henceforth refer to this issue as the *inclusion* question.

In this particular case, an insight to the question might be found in an exploration of independent evidence from the morphology of gender: namely, while the diminutive never changes the gender of its stem, the augmentative can change the gender of the stem (e.g., *o mulherzão*, 'the-masc. woman-aug.masc.'). This independent difference may provide the basis for a solution, explores by Ferreira, namely that the augmentative, unlike the diminutive, becomes the "head of the word" (in the sense of Di Sciullo and Williams

[4] That this is morphologically-conditioned can be witnessed by the fact that it does not apply root-internally, e.g., *pulsar* 'to pulse'.

[5] Earlier studies include Menuzzi (1993) and Lee (1999). Bachrach and Wagner (2006) note that these overapplication effects apply in compound formation as well and propose that *-zinho*, the diminutive, is a case of compounding, not affixation, and thus subject to regular compound phonology. An analysis along those lines does not encounter the problem in the text if *-zao*, the augmentative, does not constitute a case of compounding.

1987 or contemporary implementations of the notion). Thus, one way of delimiting the scope of an identity effect might be relativizing the subset of participating forms to those that share the same headed substructure, as determined by formal notions of headship such as control of gender specification.

In addition, there may be metrics of inclusion that are more semantically-based. The idea that semantic relatedness might have an effect on morphological structure receives independent (though indirect) support through work by Baayen and colleagues (cf. Bertram, Baayen, and Schreuder 2000) on morphological family size. Bertram et al. discovered that the family size of a Dutch word (the number of other distinct forms in the language containing the same base, e.g., *work, works, worked, clockwork, workman, woodwork, worker, homework*) speeds up the reaction time (RT) in a lexical decision task on any single word containing this base. This general finding was replicated in five of six experiments for inflectional and derivational suffixes but did not hold for the deadjectival suffix *-heid* '-ness'. For this suffix, no significant correlation was observed between family size and RT. However, once the authors removed semantically opaque family members, the corrected family size did correlate with reaction time. This set of results suggests that morphological co-activation (a diagnostic of relatedness) is sensitive to semantic relatedness in a way that might ultimately tie "head of a word" to a more semantically-based set of diagnostics.

1.2.3 *Paths towards predictive theories of bases and subparadigms*

In the examples above, we provided two possible solutions for the case studies at hand. In the case of the asymmetry question, we appealed to markedness. But is the asymmetry question always resolved by the principle in which the basis for inflectional identity is the *unmarked form*? (In fact, Albright's chapter on Yiddish in this volume, to which we return in Section 1.5, suggests a plural-to-singular identity effect which would contradict this principle). This is a question that demands further exploration. For example, do overapplying identity effects always go from third person to first, which would be expected on the basis of unmarkedness? This remains to be seen.

In the case of the inclusion question, we appealed to headedness and headship as an explanation for the fact that some affixed forms are included in a paradigm while others are not. But is a family of inflectionally-identical forms always determined by sharing a common head? This question becomes particularly thorny when one looks at the verbal domain, where identity effects arise for certain verbs in certain tenses. The fact that this only happens for verbs

of certain conjugation classes makes it look like the verb is the determining head of the word, but, on the other hand, the fact that it is tense-conditioned (and moreover contemporary syntactic theory takes inflection/tense to be the most prominent head of a word) suggests that this issue again demands more attention. For example, are all English compounds which share a right-hand head-of-the-word (e.g., *blockhead, blackhead, redhead*) thought of as constituting a paradigm? The work of Bertram, Baayen, and Schreuder (2000) would answer in the affirmative, based on diagnostics of facilitated reaction time, but it remains an open question whether all related forms that can exert facilitation in lexical decision will be subject to the force of phonological identity effects.

The asymmetry question and the inclusion question illustrate the need for a rigorous formalization of the principles governing the formation of the paradigms and "mini-paradigms" used in invoking identity effects. Many researchers continue to argue for the introduction of powerful inter-derivational output-based constraints which are predicated over paradigms, without direct attention to these questions.

The chapters in this book can be read both as a critical evaluation of recent transderivational analyses but also as examples of attempts to pave the way for an integrative approach to what yields identity-based effects and their directionality among particular paradigm members and not others. By concentrating closely on the morphological analysis of the forms at hand, many of these questions become illuminated. Throughout this introduction, we will situate the contributions of the chapters in this volume, exemplifying many of the issues with critical discussion of the empirical terrain of inflectional identity recently explored through a paradigmatic lens.

1.3 Paradigm-based explanations, their pitfalls, and alternatives

The first three chapters in the volume present a critical look at paradigm-based explanations. In second chapter, Jonathan Bobaljik examines the Optimal Paradigms framework, proposed by McCarthy (2005), and discusses cases of a syntactic difference between the category of nouns and verbs as a way of explaining phonological effects. Syntactic categories are invoked as an explanatory force in identity effects and raise many important foundational and implementational issues that arise when one pursues this intuitively very plausible line of explanation in serious depth. The third chapter, by Morris Halle and Alec Marantz, examines the "No Blur" principle of paradigm structure, proposed by Cameron-Faulkner and Carstairs-McCarthy (2000), and

raises a case study from Polish that addresses the question of "inclusion" with regard to which dimensions of paradigm organization should be within the scope of statements about syncretism. The fourth chapter, by Peter Svenonius, shows that an apparent paradigm effect in Sámi stems is better understood through a more principled look at phonological structure.

As a first point in the discussion, we will consider recent models of paradigm-based identity effects. The Optimal Paradigms framework, introduced by McCarthy (2005), is an attempt to explain phonological patterns in certain categories (e.g., noun vs. verb) as the result of the affixal environments in which those words occur rather than as the result of their syntactic category. It is thus an attempt to derive a pattern of inflection from phonotactics of the language rather than what appears otherwise to be the influence of morphological category on phonological shapes. To give a concrete example (one which is not explored by McCarthy but a plausible candidate for an OP-type analysis), consider the difference in stress in English noun-verb pairs such as *récord* (n.) vs. *recórd* (v.). The traditional explanation for this contrast is that verbs with a heavy second syllable have final stress, while many disyllabic nouns with prefixes or pseudoprefixes have initial stress (Hayes 1981, 313 ff, e.g., *cónvent, íncome, ádage*). The difference is thus characterized as the result of category-specific stress templates. However, the question arises, why couldn't it be the other way around? In other words, why couldn't nouns have the final stress pattern and verbs have the initial stress pattern?

The Optimal Paradigms line of explanation allows the possibility of considering these effects in the context of affixation. While the majority of overt *verbal* suffixes include a vowel, e.g., *-ed, -ing*, the most frequent suffix to nouns does not contain a vowel: *-s*. The noun *récord*, in its affixed plural form *récords*, still retains a penultimate stress pattern. However, the verb *recórd*, with its past and progressive forms *recórded* and *recórding*, now shows penultimate, rather than final stress. The general tendency then is for affixation to yield a penultimate stress pattern for these forms:

(1.3) Verbs with Stem-Final Stress, Nouns with Stem-Initial Stress:

noun forms	récord, récords	2 out of 2 penultimate
verb forms	recórd, recórding, recórded	2 out of 3 penultimate

Consider now the hypothetical **recórd* (n.) vs. **récord* (v.). The progressive and past forms, **récording* and **récorded*, would show a highly marked pattern of initial stress on a light syllable followed by two unstressed heavy syllables.

(1.4) Hypothetical: Nouns with Stem-Final Stress, Verbs with Stem-Initial Stress:

noun forms	recórd, recórds	0 out of 2 penultimate
verb forms	récord, récording, récorded	1 out of 3 penultimate

Comparing (1.3) with (1.4), the Stem-Final pattern stress in verbs clearly emerges as preferable overall when one considers the set of affixed forms. The Optimal Paradigms consideration of the affixed forms (the entire "paradigm" of verbal forms) thus yields insight into why the pressure for penultimate stress in the affixed forms might be leading to the final-stress pattern in bare verbal forms. In fact, the OP claim would be that stem-final stress in the verb *recórd* is the result of a sacrifice in order to accommodate penultimate stress in the affixed forms; in a sense, "overapplication" of stem-final stress even in an unexpected place.

OP requires the use of "second order" constraints, in which the input and output of an optimization tableau is not a single input form mapped to its output form but an entire paradigm of input forms mapped to an entire paradigm of output forms. It is straightforward to point out that analogical "extension" effects, in which a phonological alternation is extended to a verb in which it did not exist before, would require third-order constraints. Constraints which demand identity of alternation patterns *between* paradigms require entire sets of the paradigms from different verb types (i.e., constraints over sets of sets of output forms) as the input and output to the tableaux. The current logic of OP always yields what analogical theorists call "leveling": a phonological pattern overapplies in places it should not, driven by paradigmatic considerations, and enforces identity among related forms. However, leveling effects are important in their own right as an identity effect that illustrates reanalysis of the base(s) of derivation.

To see this issue in context, consider European Portuguese (EP), which exhibits an analogical extension effect in the vowel height of third conjugation (*-ir*) verbs. EP has two relevant phonological processes: Prosodic Lowering, which lowers mid-vowels e, o to ɛ, ɔ under main stress, and Morphological Raising, which raises mid-vowels e, o to i, u in the present tense first person singular and in the present subjunctive.[6] Verbs whose final stem vowels are mid-vowels are eligible for both processes, yielding alternations such as [dormír, dúrmu, dɔ́rməs] in (1.5a.):

[6] See Harris (1974), Quicoli (1990), Wetzels (1995), and Mascarenhas et al. (2005) for much more detailed discussion of the facts.

(1.5)		infinitive	2sg	1sg	
	a.	dormír	dɔ́rməs	dúrmu	'sleep'
	b.	escovár	escɔ́vəs	escɔ́vu	'brush'
	c.	punír	púnəs	púnu	'punish'
	d.	fuʒír	fɔ́ʒəs	fúʒu	'flee'

Verbs whose final stem vowels are mid-vowels but are not in the third conjugation, however, are not subject to Morphological Raising: (cf (1.5b.)). Third conjugation verbs with a high stem vowel are (vacuously) subject to Morphological Raising but not to Prosodic Lowering (1.5c.).

However, the alternation between a low mid-vowel in the 2sg and a high vowel in the 1sg has been extended to some verbs whose underlying stem vowel is etymologically a high vowel, such as *fugír* 'flee' (1.5d.), yielding "exceptional" alternations of the form "infinitive [u], 2sg [ɔ]". The OP model, and indeed any model that has whole paradigms entering as candidates to a computation aiming to minimize alternations and maximize faithfulness among members of a related paradigm, is at a loss to explain the "importation" of nonfaithful alternations into a paradigm.[7] Cases of leveling and analogy are thus perhaps better understood as reanalysis of the underlying form providing the derivational base for inflectionally-related members. When the underlying form is reanalyzed in favor of a neutralized variant of the related outputs, leveling occurs; when it is reanalyzed in favor of a more abstract variant of the related outputs, extension occurs. In other words, many cases of both identity-creating and identity-destroying changes in the form of a paradigm are perhaps best understood in terms of a change in an underlying form rather than a negotiation among the surface forms.

Returning to the asymmetry question, Jonathan Bobaljik's chapter in this volume delves into a number of issues related to OP implementations of leveling. McCarthy's OP paper proposed that noun-verb asymmetries in the morpheme structure constraints of Classical Arabic arise as an epiphenomenon of synchronic constraints that evaluate entire inflectional paradigms, enforcing maximal uniformity within the paradigm, at the cost of forcing overapplication of phonological processes in very specific environments. As discussed in the *récord/recórd* example above, the idea is that apparent phonological sensitivity to morphosyntactic category (N/V) is a result of accidental, emergent properties of the classes of inflectional affixes with which nouns and verbs may combine.

[7] See Maiden (1991) for a discussion of height alternations within a theory of their potential functions in Romance morphology.

A question that arises here is why stems undergo optimization to accommodate affixes and not vice versa. Perhaps an appeal to open vs. closed class item may be one way to make the cut in general. However, Bobaljik concludes that there is no good answer in the case of Arabic as to why it is affixes that determine the form of stems and not vice versa, since Arabic stems are the result of a fixed set of closed-class non-concatenative templates, which could logically just as easily force phonological accommodation in the other direction. Through a case study of Itelmen noun/verb differences in epenthesis (nouns alternate but verbs do not, retaining schwa even when phonologically "unnecessary" in some forms), Bobaljik advocates a cyclicity-based explanation for the difference between nouns and verbs: the hypothesis is that the morphosyntactic structure of these categories interfaces with phonological process such as syllabification according to possibly different dynamic timing. This opens a potentially fruitful research strategy, as it leads one to ask questions about syntactic differences in word formation between nouns and verbs,[8] and whether the cycle of syntactic transfer to the phonology coincides with the cycle of transfer to semantic interpretation.

In their chapter in this volume, Halle and Marantz critically explore further issues involved in employing reference to paradigm structure in explanations of inflectional identity effects. They discuss Carstairs-McCarthy's NoBlur constraint on paradigms (Carstairs-McCarthy 1994), which states that "In every morphological category, at most one affix may appear in more than one stem class." In other words, suppose there are four conjugation classes in a given language. In the expression of, say, the nominative, there can be patterns of the forms in Systems 1, 2, and 3 below, but not System 4 where there are two separate affixes, a and b, used in more than one class.

(1.6)

	class I	class II	class III	class IV
System 1:	a	a	b	c
System 2:	a	b	c	d
System 3:	a	b	c	c
*System 4:	a	a	b	b

In effect, No Blur requires that no more than one marker can fail to identify inflection class unambiguously, but in System 4, both a and b fail to identify a class unambiguously. Noyer (1994) suggests that there is a violation of No Blur

[8] It is not however altogether clear that cyclicity alone can explain phonological asymmetries in nouns and verbs. In the Portuguese verbal system, all mid vowels (i.e., e, o) become [−ATR] under primary stress (i.e., ɛ, ɔ). This does not happen in the nominal system, however. One could posit a different cycle of vowel lowering for verbs than nouns, but it is not obvious that the invocation of cycles adds anything to the category difference.

within the English past tense and participle endings for classes of irregular verbs, which can be viewed as conjugation classes. Verbs of the type *played* are Class I, verbs of the type *dwelt* are Class II, verbs of the type *put* are Class III, verbs of the type *beat, beaten* are Class IV, and verbs of the type *showed, shown* are Class V:

(1.7)	I	II	III	IV	V	
	-d	-t	-Ø	-Ø	-d	+past
	-d	-t	-Ø	-n	-n	+past, +participle

The past tense has more than one marker appearing in multiple places. Noyer notes that Class V is in fact gradually becoming leveled out to *have showed* in many dialects of English, and suggests more generally that No Blur is a learnability bias but not a grammatical constraint, and moreover that this learnability bias can be overcome in cases of small numbers of class/category combinations.

Cameron-Faulkner and Carstairs-McCarthy (2000) consider seven conjugation classes of Polish nouns, which show an apparent violation of No Blur in the dative. In the dative, the suffixes *-owi* and *-u* occur in more than one class. Cameron-Faulkner and Carstairs-McCarthy (2000) note that an apparent solution to this problem is to redefine the classes using "superclasses" so that the dative *-u* of classes 3 and 4 is the exponent of only one class (a move that is in spirit not unlike the class-feature decomposition of Alexiadou and Müller's and Trommer's chapters in this volume). However, Halle and Marantz point out that this misses the fact that *-u* is the "elsewhere item" throughout the paradigm, appearing in the locative of classes 2, 4, 5, and 7, the vocative of classes 2 and 7, and the genitive of classes 6 and 7. No Blur is a constraint on identity that is formulated to only look at "horizontal" rows (e.g., across conjugation classes) of paradigms but misses the fact that elsewhere items appear in "vertical" (e.g., across cases) syncretisms as well. Müller (2006) points out that the Icelandic nominal declension also exhibits a good deal of transparadigmatic syncretism (unexpressible via No Blur, which is formulated only for single categories), and suggests that the correct upper bound restriction on "paradigm economy" (i.e., on the number of distinct signals/markers within a set of inflectionally-related forms) comes when there is one maximally underspecified marker per domain.

In reanalyzing the Polish declension, Halle and Marantz propose an alternative employing *impoverishment* (Bonet 1991; Noyer 1992; Halle 1997), a restrictive form of feature changing (in which there is only feature deletion)

prior to morphological realization. Deletion of case features in the appropriate categories will render the resultant feature bundle compatible only with the elsewhere item. This essentially leads to two sources of syncretism: underspecification for class (e.g., *-owi* is for all datives) or impoverishment of case features (yielding *-u*, the default for the entire paradigm) in the relevant set of stems. This account provides an explanation for cases where No Blur is violated, attributing the two blurring affixes to two distinct grammatical mechanisms, neither of which directly refer to paradigm structure. The existence of transparadigmatic identity effects poses, in this case, an instance of the inclusion question which is answered not by referring to paradigms but to sets of features and potentially underspecified markers that express them.

Many of the identity effects we have discussed involve phonological effects which are unexpected from the point of view of regular phonological computation based on the locally derived morphological structure of the form in question. Svenonius's chapter in this volume presents a detailed and enlightening discussion of the morphophonologically complex consonant gradation in Northern Sámi. Consonant gradation has a phonological origin but is currently a morphologically-driven process, used to mark different cases in the nominal domain and different tenses in the verbal one. The author discusses the difficulty in determining the base form in such alternations, highlighting a common issue in the analysis of paradigms.

In the Sámi nominal domain, even and uneven syllable stems pattern differently with respect to consonant gradation. In fact, whenever one class presents a strong form, the other class will present a weak form, and vice versa. Such a situation might suggest the effect of a paradigmatic constraint. However, Svenonius demonstrates that a purely derivational account can account for the pattern without appeal to paradigms. Moreover, this account is flexible enough to accommodate exceptions to the pattern alluded to above, a fact that might be difficult to handle in a paradigmatic approach.

1.4 Sources of identity effects: Shared morphological features

The next section of this volume is composed of proposals exploring particular perspectives on the *inclusion* question raised at the outset. The chapters by Artemis Alexiadou and Gereon Müller, Andrea Calabrese, and by Jochen Trommer, answer the question of what is included in a set of relevant

inflectionally-identical forms, by examining the morphosyntactic basis of featural identity, in the Jakobsonian tradition of decomposition.

Decomposition (or "subanalysis" as it is sometimes called) is an approach to morphological structure that adopts the principle that shared signals reflect shared structure. Decompositional analyses of syncretism appeal to shared structure either at the level of subtrees of hierarchically organized morphosyntactic nodes, or at the level of morphosyntactic features on these nodes. At the level of shared featural identity, for example, the identitical suffixes for the dual and the plural in the indefinite noun paradigm of Sámi (Vinka 2001) reflect a shared feature within the subparts of the categories "dual" and "plural", namely the shared value of a feature: [−singular].

To appreciate the role of shared substructural identity, one can consider a case study involving the distribution of the allomorph *-t-* and its accompanying suppletive stems in Latin, and their subsequent loss in proto-Romance. In pre-classical Latin, a number of suffixes contained an initial *-t-* (probably reflecting an older morphological structure), including *-turus* (future active participial), *-tor* (agentive nominalizer), *-tio* (eventive nominalizer), *-tum* (supine), and *-tus* (past participle).

In stems ending in a coronal, a phonologically transparent process modified the final stem consonant and suffix initial consonant (e.g., *vid* + *tus* → *viit-tus* → *viissus* → *visus* 'seen'). In Classical Latin these processes became opaque and stem alternations such as *vid/vis* 'see' were treated as stem allomorphs on a par with "genuine" allomorphs as in *jub/jus* 'order'. Following Aronoff (1994), we assume that as a consequence, the *-t* initial suffixes were reanalyzed as V-initial and the suffixal *-t* became part of a stem allomorph (cf. Aronoff 1994 on the *t*-stem).

The use of this *t*-stem allomorph (sometimes also reanalyzed with an *-s-* instead of *-t-*) in Latin, also called the perfect passive participle, became rather heterogenous. Thus, the verb *premere* "press" used the participial allomorph in *pressus* (past participle), *pressu:rus* (future active), and *ex-pressor* "agentive noun". Learners of Classical Latin were confronted with a peculiar empirical generalization: a number of seemingly unrelated V-initial suffixes were all associated with the *t*-stem allomorph. The question is how speakers of Classical Latin represented this generalization in their grammars. Aronoff postulates an affix specific rule that determines which stem would surface. This solution does not assume any morphosyntactic relation among the environments where the *t*-stem surfaces. As a result, this solution is not compatible with the principle invoked above that phonological identity reflects syntactic identity.

Embick (2000), attempting to preserve this principle proposes that these seemingly disparate sets of "deverbal" categories all share the stem allomorph *press-* because they share a common syntactic structure: a subtree of Aspect-*v*-Root that does not combine with Tense. Infinitive forms involve combination with Tense, and no syntactically projected aspectual head and as a result, take *prem-*. The remaining forms take *pres-*. Perfect passive participial forms are characterized by lack of head movement of Aspect to Tense, thus resulting in analytic forms (e.g., *ama:tus sum* 'loved.participle auxiliary-1sg.'). Future forms do not involve a Tense node but rather encode future by a modal head. Finally, deverbal agentives do not involve a Tense node. Most importantly, Embick shows that "deponent verbs", active verbs that have an analytic perfect (compare *ama:vi:* 'I have loved' with *hortatus sum* 'I have exhorted') are also the result of failure of Aspect to raise to Tense.

The distribution of Latin *t*-stems, then, signals a shared identity: presence of Aspect and lack of Tense within the morphological word of the root verb. However, in Romance languages, the distribution of *t*-stems became dramatically reduced. The primary reason was that many of the *t*-inducing suffixes dropped out of the language. Only two relevant suffixes remained, the past participle *-(t)us* and the agentive *-(t)or*. In addition, gradual loss of the synthetic perfect forms and of the deponent/nondeponent difference would have led to a situation in which the distribution of the *t*-stems was no longer so clean. At this point, a predictive question arises: would learners of Romance languages preserve the distribution of the Latin stems? The decompositional perspective expects learners of Romance to be biased against what became an unnatural *t*-class and to prefer a distribution of stem allomorphs that reflects a morphosyntactically natural class. This prediction is not shared by the affix specific rule perspective.

Steriade (2002) observes that in two Romance descendents of Latin, the (now reduced) unnatural *-t-* class has been clearly discarded. In Romanian and French the *t*-stem is only used for the perfective past participle. The agentive, which is not perfective, takes the unmarked stem. Italian, a more conservative Romance language, appears at first to falsify the prediction of "shared form, shared structural identity", since the *t*-stem still seems to be used as a base of the agentive. Following Tucker (2000), Steriade argues that despite surface appearance, Italian does not make use of the *t*-stem in the agentive derivation. If Steriade is correct then Italian presents a particularly interesting case. While in contemporary Italian the surface facts support the Latin original rule, learners ignore these data in favor of a less arbitrary rule: one which makes sense from the point of view of featural identity at the morphological level.

Tucker (2000) discusses the fact that in contemporary Italian, many agentive formations (e.g., *lavoratore*) are ambiguous between a derivation from the past participle + agentive *-ore* and a derivation from the infinitive + agentive *-tore* (1.8a.b.).

(1.8)		infinitive	past participle	agentive	
	a.	lavora-re	lavorat-o	lavoratore	'work'
	b.	acquisi-re	acquisit-o	acquisitore	'acquire'
	c.	fonde-re	fus-o	fonditore	'melt'
	d.	invade-re	invas-o	invasore	'invade'

Thus, *lavoratore* is ambiguous between a derivation as *lavora+tore*, built on the infinitive, or as *lavorat+ore*, built on the past participle. However, other agentives are clearly built on the infinitive (1.8c.) or the past participle (1.8d.). Tucker conducted elicitation and acceptability experiments, revealing that speakers of contemporary Italian overwhelmingly prefer the infinitive as the base for novel agentives, despite the apparent positive evidence provided to the contrary.

Steriade provides further evidence that at least as early as 12th-century Italian, new agentive forms were no longer constructed on the basis of the perfect stem. This is evidenced by the fact that verbs which had innovative perfect forms in Italian, such as (1.9), built their agentives on the infinitive and not on the perfect. In other words, Italian agentive formation came to respect the shared substructure generalization, in which agentives do not share features or structure with the perfect but rather with the infinitive:

(1.9)	Latin perfect	victus	collectus
	Italian restructured perfect	vinto	colto
	Italian infinitive	vincere	cogliere
	Italian agentive	vincitore	coglitore
		*vintore	*coltore
		'conquer'	'harvest'

This discovery, coupled with Tucker's results above, strongly suggests that extant Italian agentives containing a perfect *t*-stem are best understood as lexical borrowings from Latin[9] and not the products of synchronic morphological operations. It seems that the Italian learners, just like their Romanian and French counterparts, simply "refused" to learn the featurally unnatural dependency between the agentive and the past participle. The difference

[9] One must assume that these borrowed agentives are treated as noncompositional by speakers of contemporary Italian.

between Italian and the other two Romance languages is that Italian contains many "borrowed" agentives and that in Italian the agentive suffix has been reanalyzed as *t*-initial, while remaining V-initial in the other two languages.

The case above is an illustration of restructuring of the grammar (in particular, the conditions for shared allomorph selection) in favor of shared structural identity, with an example from the interaction of derivational and inflectional morphology with Tense and Aspect subtrees. We take this case to be an illustration of an important type of answer to the inclusion question for inflectional morphology more generally: learners disprefer accidental homophony and will seek an underlying grammatical motivation as the basis for a shared phonological form. The three chapters in this section pursue this idea within the realm of the morphological features underlying inflectional morphology.

The contributors to this section propose that learners treat surface forms as related phonologically when they are related morphologically at the level of identity of morphological features underlying case and conjugation class. Treating categories such as conjugation class and case as not atomic but rather composed of binary features, allows for the expression of two types of processes: *grouping* (i.e., why, say, conjugation classes X and Y should behave together) and *opposition* (i.e., why, say, conjugation classes A and Z are distributed in a polar organization). The contributors to this section also argue that features may be ordered along specific dimensions, i.e., hierarchically organized within a feature structure or characterized by sets of implicational relations among feature values.

Trommer's chapter in this volume tackles the question of Amharic verb classes, which are traditionally grouped into macro-classes A, B, and C. He shows that these can be decomposed into more primitive features such as "gemination in the perfective" and "vowel quality X after root-consonant 2." This feature-based decomposition (which groups classes A and B with respect to a certain feature) enables an explanation of syncretism in certain morphological environments. Class A verbs look like Class B verbs in the so-called *as*-derivation due to the basic DM mechanism of feature deletion ("impoverishment"), which renders Class A featurally identical to B in terms of morphophonological conjugation features, and hence phonologically similar as a result. Trommer captures implicational relations among these features by using the tools of feature geometry, which allow autosegmental delinking to delete not only a single feature but also all of its constituent dependents. The importance of having a hierarchical representation of features thus comes from the fact that features which are

deleted together in the same environment do not consitute random subsets of the universe of features but rather follow implicational trends in their patterning.

Alexiadou and Müller, in their chapter in this volume, also pursue a featural decomposition of conjugation classes and focus on the empirical phenomenon of transparadigmatic syncretism. They also pursue a decomposition of the morphological exponents of abstract case[10] (e.g., the morphological categories "ACC" etc.) into more fine-grained binary features in the general tradition of Bierwisch (1967). Finally, they adopt a hierarchy of features so that, when multiple possible underspecified affixes could be considered to realize a morphosyntactic exponent, not only the number of features, but also *which* features are specified (e.g., specification for number is more important than specification for case) is a consideration governing affix choice. The paper contains three detailed case studies, in Russian, Greek, and German. Importantly, Alexiadou and Müller situate the role of class features such as conjugation class in the syntax, as syntactic probes seeking specification for phi-features. This allows for a novel treatment of "indeclinable" nouns and a rethinking of why fusional inflection might exist in the first place.

In discussing specific values of certain features, Calabrese makes central use of markedness to derive patterns of syncretism. An important issue within the study of markedness is how and where markedness information is encoded. Calabrese, in his work on phonological markedness (Calabrese 1988 et seq.) and his chapter in the present volume, represents markedness through *filters*, which constitute grammatical statements of markedness (indeed, this filter-based notion of markedness has been taken up by Optimality Theory in the form of declarative constraints).

The nature, origin, and representation of markedness remain important open questions in morphological theory, and other perspectives exist. A different view of the representation of markedness is in terms of "amount of structure" and this is the view taken in underspecification-based proposals such as Avery and Rice (1989) in feature-geometric phonology and by Harley and Ritter (2002) in morphology. In these models, markedness can be directly read off the representation by the number of nodes that are explicitly present. A third, functionalist perspective on the representation of markedness is that it is "grounded" in the interface that ultimately exchanges representations with the module of interest. Hayes et al. (2004) represents an attempt to derive all

[10] For compelling recent arguments that morphological case is distinct from abstract case (which is assigned syntactically), see Legate (2007).

phonological markedness from phonetic difficulty (broadly speaking). Similarly, one might pursue within morphology the notion that morphosyntactic markedness may be grounded in conceptual difficulty (e.g., that the cognitive representation of pluralities is inherently more complex than singularities).[11] This possibility has not been widely explored within the theory of morphological markedness. A final possibility is that morphological markedness, as typologically revealed, may be a property of the nature of acquisition mechanisms and the filters of diachrony but not an inherent part of the computational system of language: this is the view endorsed by Hale and Reiss (2000) and Blevins (2004) for phonology and by Hawkins (2004) for syntax, though, to our knowledge, it has not been explicitly proposed as a factor in discussions of morphological markedness. However, one possible analog is usage-based or "Zipfian" markedness, i.e., the idea that markedness is a grammaticalization of usage frequencies over time. The notion of markedness as an inverse reflection of text frequency has been espoused by Greenberg (1966) and more recently Haspelmath (2006), though Greenberg noted it to be problematic particularly for person, since narratives inherently vary on their frequency of use of first and second person as opposed to third, despite the universal markedness of the former over the latter.

Calabrese's analysis of case system patterns in terms of featural decomposition combined with explicit feature co-occurrence restrictions allows a treatment of syncretisms in terms of morphological markedness. In the study of markedness within linguistic theory, there are important distinctions that govern where marked features may be avoided, neutralized (syncretism), or deleted (impoverishment). A crucial distinction made by Calabrese is between context-free vs. context-sensitive markedness. Thus, context-free markedness may ban/disprefer the value of a particular feature (e.g., [+location], shared by locative, ablative, and instrumental cases) everywhere within the grammar, while context-sensitive markedness may ban a feature value only within the context of others (e.g., [−location] is deleted when it co-occurs with [+peripheral] and second declension features).

The contributors to this section emphasize the organization of features in hierarchical and/or implicational relations among feature values. This representational perspective examplifies a possible answer to the inclusion characterizing which sets of features will be likely to form natural classes for identity effects.

[11] See Feigenson and Carey (2005) for a recent study of the prelinguistic represetation of plurality.

1.5 Sources of identity effects: Asymmetric dependence on a base

The third section includes two very different approaches to singling out a base of derivation, crucial under the rubric of the asymmetry question proposed above. The chapter by John Bailyn and Andrew Nevins includes a proposal that Russian nouns are based not on any single output form but rather on an abstract stem of derivation formed by a nominal root followed by a theme vowel. This move simplifies the otherwise puzzling derivation of the genitive plural. The chapter by Adam Albright includes a proposal that learners single out a base of derivation (a "kennform" in the sense of Wurzel (1989)), which is the information-theoretically most informative surface form, and use this as the basis for inflectional identity. The chapter by Donca Steriade provides a case study in the relation between the paradigmatic structure of the nominal case system and denominal derivational morphology. Elaborating on Albright's proposal, Steriade proposes that speakers make use of privileged members of the derived lexicon, "kennforms" in Wurzel (1989), and have access to potentially multiple bases from which identity effects derive.

Much recent literature has emphasized the output-oriented aspect of morphophonological computation (although this issue is independent of how much constraint interaction plays a role in the theory of grammar). In an output-oriented view, paradigms represent an "egalitarian" collection of output forms. This stands in contrast to a view of paradigms in which what binds all forms together is sharing a common base of derivation. In their attempt to explain a change in progress in Japanese, Ito and Mester (2004) employ this egalitarian property of paradigm organization, through a combination of allomorphic identity and anti-homophony as both globally computed over the verbal paradigm.

Ranuki is a process of *ra*-deletion, a spreading grammatical change in contemporary colloquial Japanese. Standard Japanese verbs can be divided into V-final and C-final verbs, e.g., *tabe* ('eat') and *tob* ('fly'). Suffixal endings show allomorphic distribution depending on whether the verb stem is V-final or C-final, as shown below:

(1.10)

		V-final	*C-final*
a.	present negative	V-nai	C-anai
b.	plain present	V-ru	C-u
c.	inchoative	V-joo	C-oo
d.	conditional	V-reba	C-eba
e.	causative	V-sase	C-ase
f.	passive	V-rare	C-are
g.	imperative	V-ro	C-e
h.	potential	V-rare- (V-re, colloq.)	C-e

Ranuki takes place in the potential form of the verb ((h.) above) so that standard *tabe-rare* surfaces instead as *tabe-re*. Ito and Mester (2004) propose to analyze this change as the promotion of an anti-homophony constraint (requiring paradigm contrast) that evaluates entire paradigms via pairwise comparison of the outputs of different cells in the paradigm. Thus, the constraint ParContrast is violated by every phonologically identical (homophonous) pair.

As can be seen above, the potential and passive slots of V-final verbs are identical: both are *tabe-rare*. While in standard Japanese, ParContrast is ranked lower than input-output faithfulness, the claim is that, in the colloquial grammar, ParContrast has been promoted and leads to truncation of the suffix from *-rare* to *-re*.

In answering the "asymmetry" question posed earlier in this introduction, and in answering the question of why truncation is chosen to satisfy ParContrast (as opposed to other phonological changes) to render the V-final potential *-(ra)re* different from the passive *-rare*, Ito and Mester propose a set of AlloCorr constraints which enforce correspondence between allomorphs of the same morpheme.

The basic intuition behind this new constraint is that two allomorphs are 'better' the more similar they are. It is plain to see that in standard Japanese, the allomorphs *rare*∼*e* for the V-final and C-final potential form are by far the worst pair with respect to AlloCorr. By replacing the potential V-form *rare* with *re*, the Ranuki innovation of colloquial Japanese not only fixes the homophony violation with the passive but also reduces the distance between the V-final and C-final potential allomorphs (*re*∼*e*). No other relevant phonological change would have resulted in a more optimal pair. Nor would have Ranuki in the passive resulted in fewer violations of AlloCorr (*-re* would not be more similar to the existing C-final passive allomorph *-are* than the full form *-rare*, assuming that deletion and insertion are equal on this count). The asymmetry question is thus answered by inspecting the existing C-final allomorphs: the potential's C-final allomorph (*-e*) is the one that would best match a proposed modification of its corresponding V-form.

The inclusion question, however, is left open in Ito and Mester's paper. Note that the C-final allomorph for the potential remains identical to the C-final allomorph for the imperative. Why is Ranuki the only contrast-enforcing repair that occurs? Replacing C-final *-e* in the imperative with *-o* would both avoid a violation of this condition and would decrease the violation of AlloCorr, as *-o* is more similar to the V-final imperative allomorph *-ro*. However, such a change does not occur.

In their evaluation of the constraint AlloCorr, Ito and Mester argue for a view of the C-final vs. V-final allomorphs as a case of allomorph selection.

The traditional view is that in most cases (apart from the imperative and the potential) the relation between the two forms of each morpheme is purely phonological, involving deletion (e.g., Kuroda 1965 and McCawley 1968). However, this is not the case in the potential, where in standard Japanese there is genuine allomorphy between *-rare* and *-(r)e*. An alternative analysis of the change between standard Japanese and colloquial Japanese, then, would be loss of the *-rare* suffix for the potential; the rest is due to operation of the truncation rule at a morphophonological boundary (/tob-re/ → [tob-e]). Loss of this suffix (and an extension of the *-r/* Ø alternation) results in the *re*∼*e* pattern. This explanation would preserve the phonologically-based insight regarding the majority of the paradigm and avoid the asymmetry or inclusion questions, as there is no reference to homophony avoidance in the grammar itself.[12]

In fact, one might consider the consequences of modifying an output-oriented constraint explanation to paradigmatic effects; instead of negotation of anti-homophony across verb types and allomorphy correspondence within verb types at the same time, one could consider the broader consequences of assuming a single, distinguished base of derivation (as suggested above, where C-final and V-final forms in Japanese are derived from a single underlying form and Ranuki involves reanalysis of the underlying form).

The chapter by Albright in this volume represents an answer to the asymmetry question by postulating that the "most informative" member of a paradigm is the one to exert asymmetric force of identity effects. As most Optimality Theoretic implementations of output-output faithfulness focus on asymmetric effects in derivational morphology, Albright's contribution is an interesting application of the output-based model to inflectional morphology. It is important to point out that the model is one in which the base of inflectional identity has two properties: it is based on a surface form[13] and it is based on a single form. Albright considers the loss of final devoicing in nouns in Yiddish, explaining this as the result of the fact that learners took the plural form as the base of derivation. Thus, in reanalyzing the underlying

[12] There are various reasons that the allomorph *-rare* may have dropped out of the language. It could be that learners prefer to have all allomorphs derived by phonological rule and thus prefer to maintain a single *-re*, with a deletion applying. It also may be the case that the motivation for the loss of potential *-rare* lies in a learning algorithm which aims to avoid homophony in acquiring vocabulary items. Note however that in such an alternative analysis of Ranuki, the grammar itself would not enforce anti-homophony among affixes, nor would it include measurements of the similarity of allomorphs.

[13] Recalling the European Portuguese discussion, a surface form literally means the form that shows vowel reduction; that is, if the infinitive were chosen as the most informative form, Albright would assume that learners do not undo vowel reduction in the infinitive to construct an underlying representation with a nonreduced vowel.

form for the paradigm on the basis of the plural and requiring an asymmetric base, the voiced obstruent came to surface in the singular as well. In support of this, Albright also shows that idiosyncratic properties of the plural such as vowel length were imported to the singular as well. Crucial in this explanation, then, was the fact that Yiddish learners chose to organize inflectionally-related forms around a distinguished member, computed from a surface form (the plural), and through a single form alone. We will put aside the first hypothesis here for the present discussion, and pursue the learning consequences of adopting a base of inflection, abstract or otherwise, from a single form with a case at hand.

The idea that speakers cannot "cobble together" an underlying representation from multiple sources of information–or perhaps, to put it less strongly, that there is an increasing cost for each additional surface form that must be integrated in order to deduce an underlying form–is challenging to integrate with some cases in which analogical leveling and extension might occur. Consider again the case of analogical lowering in European Portuguese (EP), discussed above (cf. (1.5)).

(1.11) a. fugir [fuʒír] 'to flee'
b. fuju [fúʒu] 'I flee'
c. foges [fóʒəs] 'You flee'
d. cf. fuga [fúga] 'fugue, flight' (noun)

Learning (1.11) requires extracting two kinds of information: height of the stem vowel, and conjugation class; however, these are not jointly found in one surface form. Given that neutralization to [u] occurs in the infinitive and 1sg of [−low] *-ir* verbs, one would expect the 2sg to become the UR, as it is least neutralized and hence most informative. Therefore, once the pattern in (1.11) develops in the language (due to extension), one would think that the UR would be the 2sg. However, if the base of derivation (or underlying form) were indeed /fɔg/, we would expect that the deverbal noun would become **fóga* as well, and perhaps that the orthography of the infinitive would restructure. The fact is that the [ɔ] in the 2sg form is unpredictable, and hence should become the source of a new underlying representation leading to restructuring of the infinitive (or the stem more generally) as **fog-ir*, counter to fact. Conversely, as there is no plausible rule elsewhere in EP which would take an underlying /u/ to [o] in the 2sg (or the 3sg or 3pl where this also happens), we are at an impasse with the single-base-of-derivation hypothesis. It seems that there must be two distinct bases: fug for the infinitive and related noun and fɔg for the 2sg. (Either of these could be the base for the 1sg, as this could result from

independently attested vowel harmony raising [o] to [u] in 1sg). Renalysis of the 2sg as fɔg came from paying attention to the 2sg as a base, as it is an environment in which stress falls on the stem and neutralizing vowel harmony does not apply, and hence is most phonologically informative in general. However, the infinitive is also most informative in terms of conjugation class information, as it has unambiguously third conjugation ending. Albright's notion of a most informative base for underlying-form construction in a set of inflectional items thus raises important further questions for tradeoffs between maintaining phonological or morphological information.

The puzzle to the "single kennform" approach posed by the Portuguese data might be resolved in the architecture proposed in Donca Steriade's chapter, in her discussion of Romanian nominal morphophonology. Steriade focuses her discussion on a set of stems (e.g., K-stems) that end in a class of consonants subject to velar palatalization in the plural when followed by high front vowel declension endings (e.g., kolak, kolatʃ-i 'bagel sg., pl.'). However, these vowel endings are not present in all noun classes (e.g., fok, fok-uri 'fire sg., pl.'). Steriade demonstrates that, in denominal formations, palatalization only happens if it happened in the plural form (iŋ-kolatʃ-i 'to roll up'), either failing to happen or choosing another allomorph otherwise (in-fok-a 'to fire up'). This behavior is somewhat similar to what happens with English fricative-final nouns and irregular voicing in the plural and in the denominal, e.g., *shelf, shelves, to shelve*, where the plural and the denominal verb share a stem allomorph, although in Romanian the phenomenon is much more systematic and occurs for a variety of phonological processes, interacting in interesting ways with singular tantum nouns and proper names (which lack plurals altogether and hence cannot undergo palatalization in derived forms). Steriade develops an architecture where the computation of derivational phonology is inflection-dependent on a privileged set of derived surface forms. She suggests that one reason that in Romanian the plural is a privileged base-of-identity is due to the fact that it provides indispensable information about a noun's declension type, thus advancing further the possibility, raised above, that "informativeness" of what is chosen as an underlying form or as one of many split-bases involves morphological as well as phonological information.

The chapter by Bailyn and Nevins in this volume represents a different answer to the asymmetry question. They demonstrate that, counter to initial appearances, it is not an output form that is determining the identity effects but rather a more abstract, pre-derivational stem for affixation. Given that paradigmatic constraints are additions to the grammar, one wants to make sure that there is no alternative explanation for the phenomenon that does not call for "extra machinery", as discussed above with reference to the Ranuki

example. Bailyn and Nevins take up the analysis of the Russian genitive plural. In traditional descriptions, this case stands out as the only plural case which exhibits gender-sensitive allomorphy. Moreover, the actual surface form of the plural genitive seems to correlate with the form of the nominative singular in what might be described as an anti-homophony relation. The authors propose a reanalysis of the case morphology in Russian that eliminates the need to refer to gender in the genitive plural and which demonstrates that the apparent relation between the nominative singular and the genitive plural are mere reflections of cyclic morphology (once one properly parses the nominal stem form). The new analysis provides a novel perspective on other puzzles in Russian such as paucal morphology.

1.6 Conclusions

The chapters in this collection thus implicate many key determinants of inflectional identity. The first is the learner's most basic tendency to avoid accidental homophony. The second is the role of subatomic identity at the level of abstract binary features. The third is the role of asymmetric bases that generate the stem for inflectional forms. Inflectional morphology lies at a nexus of many grammatical interfaces: phonological well-formedness, the reflex of syntactic agreement and concord operations, and, most crucially, the interface with the lexicon, an inherently associative data structure which attempts to optimize for access and storage. The patterns of inflectional identity constitute a rich and varied set of natural language phenomena without any single underlying cause. To paraphrase J. L. Borges, it is surely a labyrinth, but it is a labyrinth devised by human minds and a labyrinth destined to be deciphered by human minds.

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