# Heteroclisis and Paradigm Linkage

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# HETEROCLISIS AND PARADIGM LINKAGE

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Heteroclisis is the property of a lexeme whose inflectional paradigm involves two or more distinct inflection classes. Although heteroclisis is widely observable, its implications for grammatical theory remain underexplored, perhaps because its canonical instances have the appearance of sporadic lexical exceptions. But heteroclisis cannot be assumed to lack any role in the definition of a language's morphology, since (i) it is sometimes highly systematic, involving whole classes of lexemes, and (ii) it obeys a universal constraint. These two facts show that heteroclisis is rule-governed. On the assumption that inflectional morphology involves a linkage of content-paradigms with form-paradigms (Stump 2002), heteroclisis can be seen as a kind of mismatch regulated by rules of paradigm linkage. Such rules account for the range of empirical phenomena subsumed by observations (i) and (ii).*

**1.** INTRODUCTION. The term HETEROCLISIS refers to the property of a lexeme whose inflectional paradigm contains forms built upon stems belonging to two or more distinct inflection classes. Consider, for example, the declension of the Czech nominal lexeme PRAMEN 'spring, source' in Table 1. In the singular portion of its paradigm, PRAMEN inflects as a member of the 'soft-masculine' declension exemplified by POKOJ 'room'; in the plural portion of its paradigm, it inflects as a member of the 'hard-masculine' declension exemplified by MOST 'bridge'.[1] Heteroclisis is a widely observable phenomenon in natural language: it is not restricted to lexemes belonging to any particular syntactic category, nor are Indo-European languages the only source of examples.[2] Indeed, languages that have inflection-class distinctions tend to exhibit heteroclisis; Table 2 lists a sampling of non-Indo-European languages exemplifying this tendency. (See §5.2 for specific discussion of Hausa and Ngiyambaa, §5.4 for Chukchi, §§3.1, 5.2, 5.4 for Fula, and §§5.2, 5.5 for Takelma.)

Despite its widespread incidence, the implications of the phenomenon of heteroclisis for grammatical theory remain relatively unexplored. Perhaps this is because the canonical instances of heteroclisis have the appearance of sporadic lexical exceptions and have therefore generally been dismissed as having no systematic role in the definition of a language's morphology. That is, perhaps the premises of the LEXICAL APPROACH to heteroclisis in 1 have been assumed to afford an adequate account of the observed properties of heteroclite paradigms.

(1) The lexical approach to heteroclisis: Heteroclisis is a lexical phenomenon—the effect of a lexical stipulation associating a particular stem and inflection class with particular sets of morphosyntactic properties.

[1] The distinction between 'soft' and 'hard' stems is only vestigially phonetic in Czech. Nominal stems ending in a palatal consonant or the dental affricate *c* always follow the soft declension, while stems ending in other consonants usually follow the hard declension, though with exceptions (Heim 1982:20).

[2] In its original use in the study of the classical languages, 'heteroclisis' referred specifically to irregularities of Greek and Latin declension; here, I assume the modern, more general sense of the term.

| | | POKOJ (m.)<br>'room' | PRAMEN (m.)<br>'spring' | MOST (m.)<br>'bridge' |
|---|---|---|---|---|
| DECLENSION: | | SOFT-MASCULINE | | HARD-MASCULINE |
| Singular | NOM | pokoj | pramen | most |
| | GEN | pokoje | pramene | mostu |
| | DAT | pokoji | prameni | mostu |
| | ACC | pokoj | pramen | most |
| | VOC | pokoji | prameni | moste |
| | LOC | pokoji | prameni | mostě |
| | INSTR | pokojem | pramenem | mostem |
| Plural | NOM | pokoje | prameny | mosty |
| | GEN | pokojů | pramenů | mostů |
| | DAT | pokojům | pramenům | mostům |
| | ACC | pokoje | prameny | mosty |
| | VOC | pokoje | prameny | mosty |
| | LOC | pokojích | pramenech | mostech |
| | INSTR | pokoji | prameny | mosty |

TABLE 1. Heteroclite inflection of Czech PRAMEN 'spring, source' (Heim 1982:22, 41f., 176).

| | | SAMPLE HETEROCLITE | |
|---|---|---|---|
| FAMILY | LANGUAGE | LEXEME | SOURCE |
| Afro-Asiatic | Hausa | ɓAMɓÀRɛ 'to tear off' | Newman 2000:708 |
| Altaic | Mongolian | MODU 'wood' | Grønbech & Krueger 1955:24 |
| Australian | Ngiyambaa | YANA 'to walk' | Donaldson 1980:158 |
| Chukotko-Kamchatkan | Chukchi | TUMG 'friend' | Spencer 1999 |
| Niger-Congo | Fula | HEN 'wind' | Arnott 1970:120f. |
| Nilo-Saharan | Fur | IDɔ 'to ask' | Beaton 1968:127 |
| North Caucasian | Tsakhur | ʞʼELjAXₒAS 'to remember' | Kibrik 1999:62, 881 |
| Oto-Manguean | Zapotec | NAB 'to ask' | Butler H[aworth] 1980:78 |
| Penutian | Takelma | WOG 'to arrive' | Sapir 1922:166 |
| Siouan | Lakota | YA 'to go' | Buechel 1939:75 |
| Uralic | Mari | O(Gə̂)M (negative auxiliary) | Kangasmaa-Minn 1998:232 |

TABLE 2. Some non-Indo-European languages exhibiting heteroclisis.

According to this approach, the heteroclite inflection of PRAMEN is an effect of the lexical stipulation in 2, where the inflection of *pramen*$_1$ as a member of the soft-masculine declension is associated with property sets containing 'singular' and the inflection of *pramen*$_2$ as a member of the hard-masculine declension is associated with property sets containing 'plural'.

(2) Stem | Inflection class | Sets of morphosyntactic properties
 *pramen*$_1$ soft-masculine declension | all well-formed sets containing 'singular'
 *pramen*$_2$ hard-masculine declension | all well-formed sets containing 'plural'

While the lexical approach might seem to be adequate to account for the specific example of PRAMEN, the conclusion that I assert here is that this approach is inadequate for any general account of heteroclisis. On the empirical plane, I discuss two facts about heteroclisis that are not accounted for by the lexical approach: (i) the fact that heteroclisis is sometimes highly systematic, involving whole classes of lexemes (§4), and (ii) the fact that heteroclisis universally obeys an observable constraint (§5). I argue that an adequate account of these two facts cannot be achieved by means of piecemeal

lexical statements such as 2, but must instead involve morphological rules of a more general sort. On the theoretical plane, I develop the approach to heteroclisis proposed in Stump 2002, according to which heteroclisis is one kind of mismatch between a language's content-paradigms and its form-paradigms (§3). In this approach, heteroclisis is regulated by rules of paradigm linkage; these afford a simple and explanatory account of the range of empirical phenomena subsumed by (i) and (ii). Before proceeding, it is useful to consider the defining properties of heteroclisis at somewhat greater length (§2), with particular attention to the relation between heteroclisis and other, superficially similar phenomena.[3]

**2.** SOME BASIC CHARACTERISTICS OF HETEROCLISIS. In the Czech paradigms in Table 1, the lexemes PRAMEN 'spring' and POKOJ 'room' inflect alike in some cells but differently in others; this partial similarity between paradigms is an essential effect of heteroclisis. It is important to recognize, however, that such partial similarity is not always an effect of heteroclisis: it may instead be an effect of default inflectional patterns. Consider, for example, the Vedic Sanskrit paradigms in Table 3: the paradigm of the feminine noun DEVÍ 'goddess' and the feminine paradigm of the adjective ŚÚCI 'bright'. These paradigms exhibit different inflectional characteristics in some cells, but are inflectionally alike in the shaded cells.

| | | SINGULAR | | DUAL | PLURAL |
|---|---|---|---|---|---|
| DEVÍ (f.) 'goddess' | NOM | devī́ | | devī́ | devī́-s |
| | VOC | dévi | | dévī | dévī-s |
| | ACC | devī́-m | | devī́ | devī́-s |
| | INSTR | devy-ā́ | | devī́-bhyām | devī́-bhis |
| | DAT | devy-ái | | devī́-bhyām | devī́-bhyas |
| | ABL | devy-ā́s | | devī́-bhyām | devī́-bhyas |
| | GEN | devy-ā́s | | devy-ós | devī́-n-ām |
| | LOC | devy-ā́m | | devy-ós | devī́-ṣu |
| ŚÚCI 'bright' (feminine forms) | NOM | śúci-s | | śúcī | śúcay-as |
| | VOC | śúce | | śúcī | śúcay-as |
| | ACC | śúci-m | | śúcī | śúcī-s |
| | INSTR | śúcy-ā ~ śúcī ~ śúci | | śúci-bhyām | śúci-bhis |
| | DAT | śúcay-e | | śúci-bhyām | śúci-bhyas |
| | ABL | śúce-s | | śúci-bhyām | śúci-bhyas |
| | GEN | śúce-s | | śúcy-os | śúcī-n-ām |
| | LOC | śúcā ~ śúcau | | śúcy-os | śúci-ṣu |

TABLE 3. Declension of two Vedic Sanskrit nominals (Macdonell 1916:80ff., 87ff.). Words expressing the same morphosyntactic property set are shaded if they inflect as members of the same inflection class.

One could portray this overlap as an instance of heteroclisis by arguing that the derivative ī-stem declension of DEVÍ follows the feminine i-stem declension of ŚÚCI in certain cells (or vice versa). This would be a questionable stance, however. There is no compelling reason to regard the shared inflectional patterns in Table 3 as basic to the feminine i-stem declension and intrusive in the derivative ī-stem declension (nor is there any good reason to regard them as basic to the latter declension and intrusive in the former). A more plausible assumption is that the shaded cells in Table 3 involve default rules of inflection to which members of both the feminine i-stem declension

[3] The evidence presented here is drawn from a database comprising more than one hundred heteroclite paradigms in thirty languages from twelve different language families; this database can be searched online at http://www.cs.uky.edu/cgi-bin/cgiwrap/~gstump/heteroclisis.cgi. (I invite readers to send me additional examples for inclusion in the database, which remains an ongoing project.)

and the derivative *ī*-stem declension are equally subject. Some such rules (e.g. the rule suffixing -*os* in the genitive/locative dual) act as defaults for every nominal in the language; others (e.g. the rule suffixing -*s* in the accusative plural) act as defaults for feminine nominals whose stems end in vowels, including members of both the feminine *i*-stem and derivative *ī*-stem declensions. Facts such as these motivate the view that a language's inflection classes function as nodes in a default inheritance hierarchy.[4] For example, the hierarchy of Vedic Sanskrit declension classes might be (partially) represented as in Figure 1; in this hierarchy, stems situated at the 'derivative *ī*-stem nominals' node have certain inflectional characteristics in common that distinguish them from stems situated at the 'feminine *i*-stem nominals' node, but stems at both nodes inherit various default inflectional characteristics from higher nodes, for example the feminine accusative plural suffix -*s* (from the 'vowel-stem nominals' node) and the genitive/ locative dual suffix -*os* (from the topmost, 'nominals' node). Genuine instances of heteroclisis, however, cannot simply be attributed to the existence of default inflectional patterns, because they involve a juxtaposition of inflection classes that ordinarily contrast: the inflection of PRAMEN, for example, juxtaposes the soft-masculine and hard-masculine declensions, which contrast in the inflection of POKOJ 'room' and MOST 'bridge'.
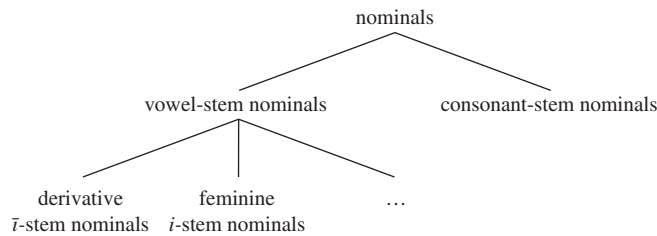


FIGURE 1. Partial representation of the Vedic Sanskrit declensional hierarchy.

Heteroclisis is closely connected to the phenomenon of stem suppletion. In inflectional instances of stem suppletion, a lexeme's paradigm is built upon two or more stems whose differences do not follow from regular rules of inflectional exponence. Consider, for example, the inflection of the Sanskrit noun HṚD(AYA) 'heart' (Table 4): the direct (i.e. nominative, vocative, and accusative) case forms of HṚD(AYA) are built on the stem *hṛdaya*, while its remaining, oblique case forms are built on the stem *hṛd*. This stem alternation is suppletive: it is not the effect of any regular rule of inflectional exponence, but is instead simply stipulated in HṚD(AYA)'s lexical entry. It is because of this stem suppletion that the paradigm of HṚD(AYA) is heteroclite: because *hṛdaya* is a neuter stem ending in *a*, it follows the neuter *a*-stem declension (like the stem *āsya* in Table 4), but because *hṛd* is a neuter stem ending in a consonant, it instead follows the neuter consonant-stem declension (like the neuter forms of TRIVṚT in Table 4).

   Presumably the heteroclite inflection of Czech PRAMEN also once involved an alternation in stem form; in modern Czech, however, the contrasting hard and soft declensional patterns are no longer strictly associated with any regular difference in stem phonology (Heim 1982:20). Nevertheless, even if the stem *pramen* remains phonologically constant in the paradigm of PRAMEN, one can maintain that this paradigm exhibits a kind of stem

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[4] See Corbett & Fraser 1993, Fraser & Corbett 1995, and other work in NETWORK MORPHOLOGY for a systematic and formally explicit development of this idea.

|  |  | ĀSYA (n.) 'mouth' | HṚD(AYA) (n.) 'heart' | | TRIVṚT 'threefold' (neuter forms) |
|---|---|---|---|---|---|
| DECLENSION: | | NEUTER *a*-STEM | | NEUTER C-STEM | |
| **Singular** | NOM | āsyam | hṛdayam | | trivṛt |
| | VOC | āsya | hṛdaya | | trivṛt |
| | ACC | āsyam | hṛdayam | | trivṛt |
| | INSTR | āsyena | | hṛdā | trivṛtā |
| | DAT | āsyāya | | hṛde | trivṛte |
| | ABL | āsyāt | | hṛdas | trivṛtas |
| | GEN | āsyasya | | hṛdas | trivṛtas |
| | LOC | āsye | | hṛdi | trivṛti |
| **Dual** | NOM, VOC, ACC | āsye | hṛdaye | | trivṛtī |
| | INSTR, DAT, ABL | āsyābhyām | | hṛdbhyām | trivṛdbhyām |
| | GEN, LOC | āsyayos | | hṛdos | trivṛtos |
| **Plural** | NOM, VOC, ACC | āsyāni | hṛdayāni | | trivṛnti |
| | INSTR | āsyais | | hṛdbhis | trivṛdbhis |
| | DAT, ABL | āsyebhyas | | hṛdbhyas | trivṛdbhyas |
| | GEN | āsyānām | | hṛdām | trivṛtām |
| | LOC | āsyeṣu | | hṛtsu | trivṛtsu |

TABLE 4. Heteroclite inflection of Sanskrit HṚD(AYA) 'heart' (Whitney 1889:§397).

suppletion: here a stem belonging to one inflection class alternates with a stem that, though phonologically identical, belongs to a distinct inflection class. On this view, heteroclisis simply entails suppletion.[5]

The reverse, however, is not true. Consider, for example, the paradigm of the Russian noun MAT' 'mother' in Table 5. Two stems participate in the definition of this paradigm: a radical stem *mat'* in the singular direct-case forms and an extended stem *mater'* elsewhere. The relation between these two stems is suppletive: there is no regular inflectional rule that gives rise to this alternation, which must instead be seen as the effect of a stipulation in the lexical entry of MAT'. Nevertheless, the entire paradigm of MAT' follows the third declension; note its parallelism to the single-stem third-declension paradigm of SVEKRÓV' 'mother-in-law' in Table 5. Thus, suppletion in itself does not necessitate heteroclisis.

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[5] An anonymous referee has questioned this assumption, since the premise that all suppletion is phonologically overt suppletion is essential to maintaining the NO BLUR PRINCIPLE (i).

(i)   NO BLUR PRINCIPLE (NBP): among the rival affixes for any inflectional cell, at most one affix may fail to be a class-identifier (in which case . . . that one affix is the class-default for the cell). (Cameron-Faulkner & Carstairs-McCarthy 2000:816)

The problem alleged here is this. The NBP is seemingly disconfirmed by Polish case morphology, neither of whose locative-case suffixes *-e* and *-u* appears to be a class-identifier; Cameron-Faulkner and Carstairs-McCarthy (2000), however, argue that the NBP can be reconciled with the Polish evidence if the selectional requirement 'minority stem alternant' is assumed to be part of the meaning of *-e* (which joins with a special stem alternant) but not of *-u* (which does not); on that assumption, *-e* and *-u* are not rivals in the sense required by (i), since in any context in which *-e* and *-u* compete, *-e* will be favored over *-u* by Pāṇini's principle. (According to this principle, competition between two or more morphological markings is resolved in favor of the marking having the narrowest 'meaning'.) The referee's objection is that if phonologically covert suppletion were allowed, then the NBP would be reduced to vacuity, since any pair of affixes apparently counterexemplifying it could be reconciled with it by treating the selectional requirement 'suppletive stem alternant' as part of one affix's meaning.

This is not, however, a convincing basis for rejecting the assumption that suppletive alternants may differ in inflection-class membership without differing in form, since the NBP is in any event widely disconfirmed.

|       | MAT' (f.) 'mother' | | SVEKRÓV' (f.) 'mother-in-law' | |
|-------|----------|----------|----------|----------|
|       | SINGULAR | PLURAL   | SINGULAR | PLURAL   |
| NOM   | mat'     | máteri   | svekróv' | svekróvi |
| ACC   | mat'     | materéj  | svekróv' | svekróvej |
| GEN   | máteri   | materéj  | svekróvi | svekróvej |
| DAT   | máteri   | materjám | svekróvi | svekróvjam |
| INSTR | máter'ju | materjámi | svekróv'ju | svekróvjami |
| PREP  | máteri   | materjáx | svekróvi | svekróvjax |

TABLE 5. Declension of the Russian 3rd-declension nouns MAT' 'mother' and SVEKRÓV' 'mother-in-law'.

**3.** THE PARADIGM-LINKAGE APPROACH TO HETEROCLISIS. In this section, I develop an approach to heteroclisis based on the notion of paradigm linkage proposed in Stump 2002. I present the fundamental principles of this approach, then show how it accounts for some of the observable properties of heteroclite paradigms—in particular, the distinction between morphosyntactically conditioned heteroclisis and morphologically conditioned heteroclisis; the cooccurrence of heteroclisis with deponency; and the fact that heteroclisis sometimes offsets the effects of morphosyntactic property neutralization and defectiveness. The need for the approach to heteroclisis proposed here is demonstrated by a range of phenomena that exclude the lexical approach in 1.

**3.1.** RULES OF PARADIGM LINKAGE. Following Stump 2002, I assume that every lexeme L in a language has an associated CONTENT-PARADIGM, a set of cells each of which consists of the pairing of L with a maximal consistent set of morphosyntactic properties.[6] The cells in a lexeme's content-paradigm (that is, its CONTENT-CELLS) correspond to the different types of nodes into which forms of that lexeme may be inserted in syntactic structure; accordingly, each content-cell has a realization that is accessible for use in syntax. Similarly, every stem s in a language has an associated FORM-PARADIGM, a set of cells each of which consists of the pairing of s with a set of morphosyntactic properties. The cells in a language's form-paradigms (its FORM-CELLS) are accessible to rules of realizational morphology and are the basis for deducing the morphological realization of the cells in that language's content-paradigms.[7]

Consider, for example, the inflected forms of the Czech nominal lexeme MOST 'bridge' in Table 1. These forms realize the content-paradigm in 3 and the form-paradigm in 4.

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In Sanskrit, for example, the dual direct-case suffixes -$\bar{\imath}$ and -*au* disconfirm the NBP. The distribution of these suffixes is not phonologically conditioned; for instance, they appear in the same phonological context in the paradigm of BALIN 'powerful' (masc. dual direct-case *balin-au*, neut. dual direct-case *balin-$\bar{\imath}$*). Moreover, both suffixes cut across a range of declension classes: -*au* regularly appears in masculine and feminine forms in all declensions except the *i*- and *u*-stem declensions (whose masculine and feminine dual direct-case forms are suffixless forms with a lengthened stem vowel) and the *$\bar{a}$*-stem declension; -$\bar{\imath}$ regularly appears in feminine forms in the *$\bar{a}$*-stem declension as well as in all neuter forms. Neither suffix coincides regularly with the use of a special stem, and because neither is specific as to gender, both must be assumed to realize the property set {CASE:direct, NUMBER:dual}. Since neither is a class identifier, these affixes disconfirm the NBP.

Evidence of this kind is not rare; see Stump 2005c for discussion of additional Sanskrit counterexamples to the NBP. In virtue of such empirical evidence, the NBP cannot be seen as compelling a rejection of the possibility that suppletive stem-alternants might differ in their inflection-class membership but not in their phonological form.

[6] See also Ackerman & Stump 2004, Ackerman et al. 2006, and Stewart & Stump 2006.

[7] Note that Stump 2002 uses different terminology for these notions, referring to 'content-paradigms' and 'form-paradigms' as 'syntactic paradigms' and 'morphological paradigms', respectively.

(3) Content-paradigm of the Czech lexeme MOST
    a. ⟨MOST, {masculine nominative singular}⟩
    b. ⟨MOST, {masculine genitive singular}⟩
    c. ⟨MOST, {masculine dative singular}⟩
    d. ⟨MOST, {masculine accusative singular}⟩
    e. ⟨MOST, {masculine vocative singular}⟩
    f. ⟨MOST, {masculine locative singular}⟩
    g. ⟨MOST, {masculine instrumental singular}⟩
    h. ⟨MOST, {masculine nominative plural}⟩
    i. ⟨MOST, {masculine genitive plural}⟩
    j. ⟨MOST, {masculine dative plural}⟩
    k. ⟨MOST, {masculine accusative plural}⟩
    l. ⟨MOST, {masculine vocative plural}⟩
    m. ⟨MOST, {masculine locative plural}⟩
    n. ⟨MOST, {masculine instrumental plural}⟩

(4) Form-paradigm of the Czech stem *most*
    a. ⟨most, {masculine nominative singular}⟩
    b. ⟨most, {masculine genitive singular}⟩
    c. ⟨most, {masculine dative singular}⟩
    d. ⟨most, {masculine accusative singular}⟩
    e. ⟨most, {masculine vocative singular}⟩
    f. ⟨most, {masculine locative singular}⟩
    g. ⟨most, {masculine instrumental singular}⟩
    h. ⟨most, {masculine nominative plural}⟩
    i. ⟨most, {masculine genitive plural}⟩
    j. ⟨most, {masculine dative plural}⟩
    k. ⟨most, {masculine accusative plural}⟩
    l. ⟨most, {masculine vocative plural}⟩
    m. ⟨most, {masculine locative plural}⟩
    n. ⟨most, {masculine instrumental plural}⟩

For each content-cell ⟨L, σ⟩ in the content-paradigm of a lexeme L, the realization of ⟨L, σ⟩ is determined by a corresponding form-cell in some stem's form-paradigm; this form-cell is the FORM-CORRESPONDENT of ⟨L, σ⟩. Thus, the form-cell ⟨most, {masculine dative singular}⟩ in 4c is the form-correspondent of the content-cell ⟨MOST, {masculine dative singular}⟩ in 3c, and so on. The REALIZATION of a form-cell ⟨s, σ⟩ is the form resulting from the systematic application to s of all applicable morphological rules realizing the property set σ; the realization of a content-cell ⟨L, σ⟩ is, in turn, the realization of that cell's form-correspondent. Thus, the realization of both the form-cell ⟨most, {masculine dative singular}⟩ in 4c and the content-cell ⟨MOST, {masculine dative singular}⟩ in 3c is the word form *mostu* (cf. Table 1).

The relation between a form-cell in a stem's form-paradigm and its realization is defined by morphological realization rules (rules of exponence and rules of referral; Zwicky 1985, Stump 2001); rules of this sort are sensitive to a stem's inflection-class membership. By contrast, the relation between a content-cell in a lexeme's content-paradigm and its realization is defined by RULES OF PARADIGM LINKAGE, by reference to the realization of that content-cell's form-correspondent. The canonical relation between a content-cell and its realization is defined by the universal rule of paradigm linkage in 5.

(5) Universal default rule of paradigm linkage: If $\langle L, \sigma \rangle$ is a content-cell and stem r is stipulated as the root of lexeme L, then $\langle L, \sigma \rangle$ has $\langle r, \sigma \rangle$ as its form-correspondent (i.e. the realization of the content-cell $\langle L, \sigma \rangle$ is that of the form-cell $\langle r, \sigma \rangle$).[8]

For instance, in view of the stipulation that the stem *most* is the root of the Czech lexeme MOST, rule 5 entails that the realization of the content-cell $\langle$MOST, {masculine dative singular}$\rangle$ is that of the form-cell $\langle$most, {masculine dative singular}$\rangle$ (namely the realization *mostu*), and so on.

In accordance with rule 5, content-paradigms are canonically CONGRUENT with the form-paradigms by which they are realized; that is, for a given content-paradigm $P_C$, there is, in the canonical case, exactly one form-paradigm $P_F$ such that each cell $\langle L, \sigma \rangle$ in $P_C$ has an identically specified form-correspondent $\langle r, \sigma \rangle$ in $P_F$, where r is L's root. Sometimes, however, this state of affairs does not hold; that is, one sometimes finds content-paradigms realized by form-paradigms with which they are not fully congruent. Indeed, this state of affairs can arise in more than one way; among the possible sources of incongruence are the phenomena of morphosyntactic property neutralization, deponency, and heteroclisis. I consider each of these in turn.

One source of incongruence between content-paradigms and form-paradigms is the phenomenon of MORPHOSYNTACTIC PROPERTY NEUTRALIZATION; in instances of this phenomenon, the morphosyntactic distinctions made among the cells of a content-paradigm are only partially preserved among those cells' form-correspondents. For example, in the inflection of neuter nominals in Sanskrit, no individual declension ever distinguishes the realization of a nominative form from that of its accusative counterpart; in order to portray this fact as a real generalization rather than as a coincidence in the definition of the various rules realizing Sanskrit case morphology, it is reasonable to assume that although nominative and accusative cells are distinguished in a neuter nominal's content-paradigm, each nominative content-cell in such a paradigm shares the form-correspondent of its accusative counterpart. Thus, suppose that the operator $\vee$ is defined as joining two morphosyntactic properties p, p′ to produce a new property [p $\vee$ p′] such that any rule realizing p or p′ also realizes [p $\vee$ p′]; one can then assume that the content-cells 6a–c in the paradigm of the neuter lexeme ĀSYA 'mouth' have the respective form-cells in 7a–c as their form-correspondents. (This analysis makes exactly the right predictions about a neuter nominal's direct-case forms, entailing, for example, that the default rule realizing the accusative singular as *-m* applies in the realization of both of the content-cells in 6a, yielding the syncretic form *āsyam*.[9])

(6) a. $\langle$ĀSYA, {neuter nominative singular}$\rangle$
       $\langle$ĀSYA, {neuter accusative singular}$\rangle$
   b. $\langle$ĀSYA, {neuter nominative dual}$\rangle$
       $\langle$ĀSYA, {neuter accusative dual}$\rangle$
   c. $\langle$ĀSYA, {neuter nominative plural}$\rangle$
       $\langle$ĀSYA, {neuter accusative plural}$\rangle$

(7) a. $\langle$āsya, {neuter [nominative $\vee$ accusative] singular}$\rangle$  (realization: āsyam)
   b. $\langle$āsya, {neuter [nominative $\vee$ accusative] dual}$\rangle$        (realization: āsye)
   c. $\langle$āsya, {neuter [nominative $\vee$ accusative] plural}$\rangle$     (realization: āsyāni)

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[8] Here and throughout, I use the term ROOT to mean a lexeme's default stem.

[9] See Baerman 2004 and Baerman et al. 2005 for arguments favoring an approach to syncretism similar to the one assumed here.

In this example, two content-cells carrying distinct values for the feature CASE share a form-correspondent whose CASE value is neutral with respect to that distinction. But instances of morphosyntactic property neutralization might sometimes involve content-cells that carry distinct values for a feature for which their shared form-correspondent is simply unspecified. Thus, in late Sanskrit, for instance, no declension realizes gender distinctions outside of the direct (nominative, vocative, and accusative) cases; for instance, in the inflection of the adjective *vīra* 'brave', masculine and neuter forms are distinguished in the nominative singular (masc. *vīras* vs. neut. *vīram*) but not in the genitive singular (masc./neut. *vīrasya*).[10] One can accordingly assume that gender is simply unspecified in the oblique-case cells of the form-paradigms of late Sanskrit nominals; the content-cells in 8a,b, for instance, can be assumed to share the form-correspondent in 8c. In view of the incidence of morphosyntactic property neutralizations such as those exemplified in 7 and 8c, the relation between a lexeme's content-cells and their form-correspondents is often many-to-one.

(8) a. ⟨VĪRA, {neuter genitive singular}⟩
    b. ⟨VĪRA, {masculine genitive singular}⟩
    c. ⟨vīra, {genitive singular}⟩                     (realization: vīrasya)

Another source of incongruence between content-paradigms and form-paradigms is the possibility that a content-cell ⟨L, σ⟩ may have a form-correspondent ⟨s, τ⟩ such that σ and τ have contrasting values for one or more inflectional categories; the effect of this sort of contrast is the phenomenon of DEPONENCY. Consider, for example, the Latin verb FATĒRĪ 'confess'. Its content-paradigm contains active cells such as 9a. But because FATĒRĪ is deponent, the active cells in its content-paradigm have passive form-cells as their form-correspondents; for instance, the content-cell in 9a has the form-cell in 9b as its form-correspondent. For this reason, the realizations of FATĒRĪ are passive in form but have the morphosyntactic content typical of active forms.

(9) a. ⟨FATĒRĪ, {1st singular present nonperfect active indicative}⟩
    b. ⟨fat, {1st singular present nonperfect passive    (realization: fateor) indicative}⟩

Heteroclisis is a third source of incongruence between content-paradigms and form-paradigms. In instances of heteroclisis, the cells in a single content-paradigm draw their form-correspondents from two or more distinct form-paradigms. Thus, consider again the Czech heteroclite noun PRAMEN 'spring' in Table 1. The form-correspondents of PRAMEN's content-cells are drawn from two distinct form-paradigms: that of the stem *pramen*$_{sm}$ (a member of the soft-masculine declension) and that of the stem *pramen*$_{hm}$ (a member of the hard-masculine declension). In particular, each singular cell ⟨PRAMEN, {masculine CASE:α singular}⟩ in PRAMEN's content-paradigm has the form-cell ⟨pramen$_{sm}$, {masculine CASE:α singular}⟩ as its form-correspondent; by contrast, each plural cell ⟨PRAMEN, {masculine CASE:α plural}⟩ in PRAMEN's content-paradigm has the form-cell ⟨pramen$_{hm}$, {masculine CASE:α plural}⟩ as its form-correspondent. Here, too, the canonical congruence of content-paradigms with the form-paradigms by which they are realized is suspended.

As the foregoing examples reveal, there are two dimensions of deviation from the canonical congruence of content-paradigms and form-paradigms. First, a content-cell's morphosyntactic property set may differ from that of its form-correspondent; this may

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[10] The feminine forms are irrelevant here, since they inflect as members of the distinct *ā*-stem declension.

be because the form-correspondent's property set includes fewer morphosyntactic contrasts (as in 7 or 8c) or because its feature specifications are actually distinct from those of the content-cell (as in 9). Second, the form-correspondents of cells belonging to the same content-paradigm may belong to distinct form-paradigms, as in the case of PRA-MEN. An adequate theory of inflection must provide for both of these dimensions of deviation from the canonical congruence entailed by 5. My proposal is that deviations from 5 are, in both of these dimensions, an effect of language-specific rules of paradigm linkage. A rule of this sort stipulates that the form-correspondent of a particular content-cell $\langle L, \sigma \rangle$ is some form-cell other than the default form-correspondent that 5 would otherwise supply for $\langle L, \sigma \rangle$; in this way, it overrides 5, suspending the canonical congruence that it otherwise enforces. Thus, consider again the two dimensions of deviation from this canonical congruence.

   The evidence of morphosyntactic property neutralization and deponency shows that the relation between a content-cell's property set and that of its form-correspondent is not always one of simple identity; to develop this idea, it is useful to draw a terminological distinction between a language's S-PROPERTIES (any property belonging to $\sigma$ in a content-cell $\langle L, \sigma \rangle$) and its M-PROPERTIES (any property belonging to $\tau$ in a form-cell $\langle s, \tau \rangle$).[11] Given this distinction, the relation between a content-cell's property set and that of its form-correspondent can be represented as a function from sets of s-properties to sets of m-properties; I here refer to functions of this kind as PROPERTY MAPPINGS. In the simplest cases—those determined by the default rule of paradigm linkage in 5—the relevant property mapping is an identity function. In the realization of the Sanskrit content-cells in 6 and 8a,b, by contrast, the relevant property mapping is the function $f_1$ defined in 10, and in the realization of the Latin content-cell in 9a, the relevant property mapping is the function $f_2$ defined in 11.[12]

   (10) Definition of the Sanskrit property mapping $f_1$: Where $\alpha$ is any gender and $\beta$ is any oblique case:
      (i) if $\sigma = \{$neut nom X$\}$ or $\{$neut acc X$\}$, then $f_1(\sigma) = \{$neut [nom $\vee$ acc] X$\}$;
      (ii) if $\sigma = \{\alpha \, \beta \, $X$\}$, then $f_1(\sigma) = \{\beta \, $X$\}$;
      (iii) otherwise $f_1(\sigma) = \sigma$.
   (11) Definition of the Latin property mapping $f_2$: If $\sigma = \{$active X$\}$, then $f_2(\sigma) = \{$passive X$\}$; otherwise $f_2(\sigma) = \sigma$.

   Property mappings such as $f_1$ and $f_2$ vary in their scope: for instance, while $f_1$ is relevant to the inflection of every nominal in Sanskrit, $f_2$ is relevant to the inflection of only a tiny minority of Latin verbs. The scope of a given property mapping must therefore be stipulated; I assume that this is effected by language-specific rules of paradigm linkage. Thus, given any cell $\langle L, \sigma \rangle$ in the content-paradigm of a Sanskrit nominal L having root r, the rule of paradigm linkage in 12 entails that the form-correspondent of $\langle L, \sigma \rangle$ is $\langle r, f_1(\sigma) \rangle$; it is this rule that assures $f_1$'s relevance to the default inflection of every nominal in the language. But where $\langle L, \sigma \rangle$ is a cell in the content-paradigm of a Latin verb L, the rule of paradigm linkage in 13 supplies $\langle r, f_2(\sigma) \rangle$ as a form-correspondent only in those instances in which L is deponent; it is this rule that assures that $f_2$'s relevance is limited to deponent verbs.

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[11] This distinction derives from and can be equated with the distinction between s-features and m-features originally drawn by Sadler and Spencer (2001:72).

[12] In 10 and 11 and throughout, I use X as a variable over sequences of morphosyntactic properties; thus, {neut nom X} represents any set of morphosyntactic properties containing neut and nom.

(12) Sanskrit rule of paradigm linkage: Where L is a nominal lexeme having r as its root, the content-cell $\langle L, \sigma \rangle$ has $\langle r, f_1(\sigma) \rangle$ as its form-correspondent.

(13) Latin rule of paradigm linkage: Where L is a deponent verbal lexeme having r as its root, the content-cell $\langle L, \sigma \rangle$ has $\langle r, f_2(\sigma) \rangle$ as its form-correspondent.

By rule 12, the content-cells in 6a–c and 8a,b have the corresponding form-cells in 7a–c and 8c as their form-correspondents; by rule 13, the content-cell in 9a has the form-cell in 9b as its form-correspondent. Because these rules are more specific than the default rule of paradigm linkage in 5, they override it, blocking the form-correspondents that it would otherwise supply and suspending the canonical congruence that it would otherwise entail.

The evidence of heteroclisis shows that the form-correspondents of the cells in a lexeme's content-paradigm need not always belong to the same form-paradigm. For instance, some of the cells in the content-paradigm of Czech PRAMEN 'spring' have form-correspondents belonging to the form-paradigm of *pramen*~sm~ (a member of the soft-masculine declension), while others have form-correspondents belonging to the form-paradigm of *pramen*~hm~ (a member of the hard-masculine declension). I assume that the choice among competing stems (i.e. among competing form-paradigms) in the inflection of a heteroclite lexeme is—like the scope of a property mapping—determined by rules of paradigm linkage. In the two rules of paradigm linkage in 12 and 13, the form-correspondent's stem is (as in 5) simply the root of its lexeme. But in instances of heteroclisis, the form-correspondent's stem generally differs from the root of its lexeme in some way, either in its form or in its inflection-class membership (or both); if it differs in any of these ways, I refer to it as a CORADICAL STEM (or simply as a CORADICAL).[13]

Thus, suppose that in Czech, *pramen*~sm~ is identified as PRAMEN's root and hence that *pramen*~hm~ is PRAMEN's hard-masculine coradical. On that assumption, form-correspondents for the plural cells in PRAMEN's content-paradigm are drawn from the coradical's form-paradigm, in accordance with the rule of paradigm linkage in 14.

(14) Czech rule of paradigm linkage: Where L is a nominal lexeme that belongs to the PRAMEN class and has s as its hard-masculine coradical, if $\sigma = \{$plural X$\}$, then the content-cell $\langle L, \sigma \rangle$ has $\langle s, \sigma \rangle$ as its form-correspondent.

The default rule of paradigm linkage in 5 suffices to guarantee that any content-cell $\langle$PRAMEN, $\{$masculine CASE:$\alpha$ singular$\}\rangle$ will have the form-cell $\langle$pramen~sm~, $\{$masculine CASE:$\alpha$ singular$\}\rangle$ as its form-correspondent. But in the plural cells of PRAMEN's paradigm, 5 is overridden by the more specific rule of paradigm linkage in 14, which causes any content-cell $\langle$PRAMEN, $\{$masculine CASE:$\alpha$ plural$\}\rangle$ in PRAMEN's content-paradigm to have the form-cell $\langle$pramen~hm~, $\{$masculine CASE:$\alpha$ plural$\}\rangle$ as its form-correspondent.

When a rule of paradigm linkage specifies form-correspondents containing the coradical s′ of some lexeme L, s′ may (as in the case of *pramen*~hm~) belong to an inflection class distinct from that of L's root; such is by definition the case in instances of heteroclisis. But the coradical specified by a rule of paradigm linkage may belong to the same inflection class as L's root (as in the case of Russian MAT' 'mother', Table 5); instances of this sort are cases of simple ( = nonheteroclitic) stem alternation.

In the inflection of PRAMEN, the distribution of the coradical *pramen*~hm~ is determined by a single rule of paradigm linkage; but the definition of a coradical's distribution

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[13] Ordinarily, the appearance of a heteroclite lexeme's root is specified by the default rule of paradigm linkage in 5, which is then overridden by one or more rules specifying the appearance of its coradicals in a narrower set of contexts; but in principle, the latter rules could in turn be overridden by an even narrower rule specifying the appearance of the root. Compare the rules in n. 22.

sometimes involves more than one rule of paradigm linkage. Thus, consider the Czech noun PŘEDSEDA 'president' (Table 6), whose root *předseda* inflects according to the hard-feminine declension and whose coradical *předsed* inflects according to the hard-masculine declension. As a member of the PRAMEN class, PŘEDSEDA is subject to the rule of paradigm linkage in 14, which licenses *předsed* in the plural; but PŘEDSEDA also belongs to a subclass of masculine animate members of the PRAMEN class that follow the hard-masculine declension in the dative and locative singular. To account for the latter fact, the lexeme PŘEDSEDA (and the other members of its subclass, for example, HRDINA 'hero', KOLEGA 'colleague'; Heim 1982:116) must be subject to the additional rule of paradigm linkage in 15.[14]

|  |  | ŽENA (f.) 'woman' | PŘEDSEDA (m.) 'president' | | FILOSOF (m.) 'philosopher' |
|---|---|---|---|---|---|
| DECLENSION: | | HARD-FEMININE | | HARD-MASCULINE | |
| Singular | NOM | žena | předseda | | filosof |
| | GEN | ženy | předsedy | | filosofa |
| | DAT | ženě | | předsedovi | filosofovi, filosofu |
| | ACC | ženu | předsedu | | filosofa |
| | VOC | ženo | předsedo | | filosofe |
| | LOC | ženě | | předsedovi | filosofovi, filosofu |
| | INSTR | ženou | předsedou | | filosofem |
| Plural | NOM | ženy | předsedové | | filosofové |
| | GEN | žen | předsedů | | filosofů |
| | DAT | ženám | předsedům | | filosofům |
| | ACC | ženy | předsedy | | filosofy |
| | VOC | ženy | předsedové | | filosofové |
| | LOC | ženách | předsedech | | filosofech |
| | INSTR | ženami | předsedy | | filosofy |

TABLE 6. Heteroclite inflection of Czech PŘEDSEDA 'president' (Kopecky et al. 1976:761, 770, 773).

(15) Czech rule of paradigm linkage: Where L is a nominal lexeme that belongs to the PŘEDSEDA subclass and has s as its hard-masculine coradical, if $\sigma = \{\alpha$ singular X$\}$ and $\alpha = $ *dative* or *locative*, then the content-cell $\langle L, \sigma \rangle$ has $\langle s, \sigma \rangle$ as its form-correspondent.

In a heteroclite paradigm such as that of PRAMEN or PŘEDSEDA, one inflection class (that of the root) serves as the paradigm's default; the paradigm's other inflection class(es) can thus be seen as 'intrusive', overriding the default class in particular cells. I assume that universal criteria determine which of a heteroclite paradigm's inflection classes is its default and which must be seen as intrusive. For present purposes, I assume the criteria in 16; ultimately, these criteria may well need to be refined and extended.

(16) Where $S_C$, $S_D$ are disjoint sets of cells in a heteroclite content-paradigm P and the forms realizing these sets of cells are inflected as members of inflection classes C and D (respectively):

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[14] Although PŘEDSEDA's coradical stem *předsed* inflects as a member of the hard-masculine declension in the dative and locative singular, it is unlike ordinary members of this declension in that it does not exhibit *-u* as an alternative to *-ovi* in these cases. I assume that this alternative suffix is restricted to roots belonging to the hard-masculine declension and therefore does not appear in the inflection of *předsed* (which, though a member of the relevant declension, is a coradical but not a root). The alternation of *-u* with *-ovi* raises a number of interesting theoretical issues quite apart from its failure to appear in the inflection of PŘEDSEDA-type heteroclites; for details, see Šmilauer 1972:144ff.

a. If (i) there is some nonempty morphosyntactic property set $\tau$ such that all and only cells in P containing an extension of $\tau$ belong to $S_C$,[15] but

(ii) there is no nonempty morphosyntactic property set $\tau'$ such that all and only cells in P containing an extension of $\tau'$ belong to $S_D$,

then C is an intrusive class in P; otherwise,

b. C is an intrusive class in P if the cell containing the least marked morphosyntactic property set belongs to $S_D$.

By 16b, the hard-masculine declension is the intrusive inflection class in the paradigms of Czech PRAMEN and PŘEDSEDA. Criterion 16b may, however, be overridden by 16a in instances in which the latter applies. Consider, for example, the paradigm of Fula HEN 'wind' in Table 7: in this paradigm, the cell containing the least marked morphosyntactic property set is the neutral singular cell containing the D-grade form *hen-ndu*; 16b might therefore be taken to entail that the A grade is the intrusive inflection class in this paradigm. But the set of D-grade cells in this paradigm includes all and only cells containing an extension of {neutral singular}, and there is no nonempty property set of which each of the A-grade cells contains an extension. Criterion 16a therefore overrides 16b, entailing that the D grade is in fact the intrusive inflection class in this paradigm.

| | | | TATAƁ 'third' | HEN 'wind' | | WAA 'monkey' |
|---|---|---|---|---|---|---|
| INFLECTIONAL GRADE: Evaluative type: | | | A | | D | |
| Diminutive | singular | (noun class 3) | tataɓ-el | ken-el | | baa-ŋgel |
| | plural | (noun class 6) | tataɓ-on | ken-on | | mbaa-kon |
| Pejorative diminutive | singular | (noun class 5) | tataɓ-um | ken-um | | baa-ŋgum |
| Augmentative | singular | (noun class 7) | tataɓ-a | ken-a | | mbaa-ŋga |
| | plural | (noun class 8) | tataɓ-o | ken-o | | mbaa-ko |
| Neutral | singular | (noun class 11) | tataɓ-ru | | hen-ndu | waa-ndu |
| | plural | (noun class 25) | tataɓ-i | ken-i | | baa-ɗi |

TABLE 7. Heteroclite inflection of Fula HEN 'wind' (Arnott 1970:89, 99, 120f.).

The Czech lexemes PRAMEN and PŘEDSEDA each have only two stems—their root and one coradical. But heteroclite lexemes sometimes have multiple stems; to accommodate such instances, one must naturally assume that different rules of paradigm linkage may determine the distribution of a lexeme's different coradicals. Thus, in Czech, nouns belonging to the hard-masculine declension follow the soft-masculine declension in the locative plural if their stem ends in a back obstruent; for instance, the noun FILOLOG 'philologist' in Table 8 generally follows the hard-masculine declension, but exhibits the locative plural form *filolozích*, whose stem-final palatalization and suffix *-ích* are marks of the soft-masculine declension. Moreover, heteroclite nouns of the PŘEDSEDA type (which follow the hard-masculine declension in the plural but not always in the singular) exhibit this same idiosyncrasy; thus, the noun SLUHA 'servant' in Table 8 exhibits both the pattern of heteroclisis displayed by PŘEDSEDA (cf. Table 6) and that displayed by FILOLOG in the locative plural. Thus, the lexeme SLUHA has three stems:

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[15] Intuitively, $\sigma$ is an EXTENSION of $\tau$ if $\tau$ is a (proper or improper) subset of $\sigma$; see Stump 2001:41 for a more exact definition of extension.

a root belonging to the hard-feminine declension, a coradical belonging to the hard-masculine declension, and a second coradical belonging to the soft-masculine declension. The distribution of these three stems can be attributed to four different rules of paradigm linkage: the hard-feminine root is used by default, in accordance with 5; this default, however, is overridden by 14 and 15, in accordance with which the hard-masculine coradical appears in the plural and in the dative and locative singular; rule 14 is in turn overridden by rule 17, by which the soft-masculine coradical appears in the locative plural.

|  |  | ŽENA (f.) 'woman' | SLUHA (m.) 'servant' |  | FILOSOF (m.) 'philosopher' | FILOLOG (m.) 'philologist' | MUŽ (m.) 'man' |
|---|---|---|---|---|---|---|---|
| DECLENSION: |  | HARD-FEMININE |  |  | HARD-MASCULINE |  | SOFT-MASCULINE |
| Singular | NOM | žena | sluha |  | filosof | filolog | muž |
|  | GEN | ženy | sluhy |  | filosofa | filologa | muže |
|  | DAT | ženě |  | sluhovi | filosofovi, filosofu | filologovi, filologu | mužovi, muži |
|  | ACC | ženu | sluhu |  | filosofa | filologa | muže |
|  | VOC | ženo | sluho |  | filosofe | filologu | muži |
|  | LOC | ženě |  | sluhovi | filosofovi, filosofu | filologovi, filologu | mužovi, muži |
|  | INSTR | ženou | sluhou |  | filosofem | filologem | mužem |
| Plural | NOM | ženy |  | sluhové | filosofové | filologové | muži, mužové |
|  | GEN | žen |  | sluhů | filosofů | filologů | mužů |
|  | DAT | ženám |  | sluhům | filosofům | filologům | mužům |
|  | ACC | ženy |  | sluhy | filosofy | filology | muže |
|  | VOC | ženy |  | sluhové | filosofové | filologové | muži, mužové |
|  | LOC | ženách |  | sluzích | filosofech | filolozích | mužích |
|  | INSTR | ženami |  | sluhy | filosofy | filology | muži |

TABLE 8. Heteroclite inflection of Czech SLUHA 'servant' (Kopecky et al. 1976:761, 766, 770, 773). Shaded locative plural forms follow the soft-masculine declension.

(17) Czech rule of paradigm linkage: Where L is a nominal lexeme having s as its soft-masculine coradical, if $\sigma$ = {locative plural X}, then the content-cell $\langle L, \sigma \rangle$ has $\langle s, \sigma \rangle$ as its form-correspondent.

Nouns having hard-masculine stems that end in a back obstruent are quite regular in shifting to the soft-masculine declension in the locative plural; to account for this regularity, I assume the general rule of stem inference in 18, whose effect is to guarantee that the rule of paradigm linkage in 17 will apply in the inflection both of nouns such as SLUHA (whose hard-masculine stem is a coradical) and of nouns such as FILOLOG (whose hard-masculine stem is its root).

(18) Czech rule of stem inference: If lexeme L has a stem s belonging to the hard-masculine declension and s ends in a back obstruent, then L has s′ as its soft-masculine coradical, where s′ is like s except that it belongs to the soft-masculine declension.

To summarize: the proposed approach to heteroclisis presupposes a distinction between a lexeme's content-paradigm and the form-paradigm(s) of its stem(s); though the two types of paradigms are distinct, they are crucially related, since a content-cell's realization is equated with that of its form-correspondent. In instances of heteroclisis, distinct stems belonging to distinct inflection classes (and therefore possessing distinct form-paradigms) participate in the definition of a single lexeme's realization. This

participation is mediated by rules of paradigm linkage, which determine the form-correspondent for any given content-cell; these include the universal rule of paradigm linkage in 5 and overriding, language-specific rules of paradigm linkage such as 14, 15, and 17. The postulation of overriding rules of paradigm linkage is independently required to account for instances of morphosyntactic property neutralization and deponency (as in the cases of 12 and 13, respectively).

Part of the plausibility of this approach to heteroclisis (the 'paradigm-linkage approach') stems from its effectiveness in accounting for a number of observable properties of heteroclite paradigms. Here, I discuss three such properties: (i) the distinction between morphosyntactically conditioned and morphologically conditioned heteroclisis, (ii) the cooccurrence of heteroclisis and deponency, and (iii) the fact that heteroclisis may in effect counteract the phenomena of morphosyntactic property neutralization and defectiveness.

**3.2.** Morphosyntactically conditioned vs. morphologically conditioned heteroclisis. In instances of morphosyntactically conditioned heteroclisis, the choice of inflection class in the realization of a paradigm's individual cells is directly determined by the morphosyntactic property sets expressed by those cells; in instances of morphologically conditioned heteroclisis, the choice of inflection class in the realization of a paradigm's individual cells is instead determined by an independently observable pattern of stem alternation. As I show here, the paradigm-linkage approach to heteroclisis affords a simple account of the distinction between these two sorts of heteroclisis.

The heteroclite inflection of PRAMEN is morphosyntactically conditioned: whether a given word form in PRAMEN's paradigm follows the soft-masculine or the hard-masculine declension depends purely and simply on the morphosyntactic properties that that word form expresses. There are, however, instances in which the alternation between a heteroclite paradigm's competing inflection classes follows an independently motivated pattern of stem alternation observable in nonheteroclite paradigms;[16] in instances of this sort, the rules of paradigm linkage needed to account for this independent pattern of stem alternation also account for the incidence of heteroclisis. Sanskrit furnishes a clear example of such morphologically conditioned heteroclisis.

An important characteristic of Sanskrit declensional morphology is a pattern of stem alternation widely observable among stems ending in consonants. A masculine or feminine nominal participating in this pattern of alternation exhibits its 'Strong' stem in the direct cases of the singular and dual and in the nominative and vocative of the plural; elsewhere it assumes a 'Weak' form. A neuter nominal exhibits its Strong stem only in the direct cases of the plural, assuming a Weak form elsewhere. Some alternating nominals possess only two stems: a Strong stem and a single Weak stem. Others have a Strong stem and two Weak stems: a 'Weakest' stem appearing before vowel-initial case endings, and a 'Middle' stem appearing elsewhere.[17] The masculine and neuter paradigms of the alternating adjective PRATYAÑC 'westerly' are given in Table 9; in these paradigms, the adjective's Strong stem *pratyañc-* (sandhi form: *pratyaṅ*) appears in the unshaded cells, its Weakest stem *pratīc-* appears in the light-shaded cells, and

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[16] Corbett (2006) argues for a comparable conclusion with regard to suppletive stem alternations in general.

[17] Strong stems as a class vary in their formation; that is, it is not their formation that ties them together, but their participation in a common distributional pattern. The same is true of Middle and Weakest stems. See Stump 2001:Ch. 6 for discussion.

its Middle stem *pratyac-* (sandhi forms: *pratyak-*, *pratyag-*) appears in the dark-shaded cells.

|  | MASCULINE FORMS | | | NEUTER FORMS | | |
|---|---|---|---|---|---|---|
|  | SINGULAR | DUAL | PLURAL | SINGULAR | DUAL | PLURAL |
| NOM | pratyaṅ | pratyañcau | pratyañcas | pratyak | pratīcī | pratyañci |
| VOC | pratyaṅ | pratyañcau | pratyañcas | pratyak | pratīcī | pratyañci |
| ACC | pratyañcam | pratyañcau | pratīcas | pratyak | pratīcī | pratyañci |
| INSTR | pratīcā | pratyagbhyām | pratyagbhis | pratīcā | pratyagbhyām | pratyagbhis |
| DAT | pratīce | pratyagbhyām | pratyagbhyas | pratīce | pratyagbhyām | pratyagbhyas |
| ABL | pratīcas | pratyagbhyām | pratyagbhyas | pratīcas | pratyagbhyām | pratyagbhyas |
| GEN | pratīcas | pratīcos | pratīcām | pratīcas | pratīcos | pratīcām |
| LOC | pratīci | pratīcos | pratyakṣu | pratīci | pratīcos | pratyakṣu |

TABLE 9. Masculine and neuter forms of Sanskrit PRATYAÑC 'westerly' (Whitney 1889:§408). Unshaded forms are based on the Strong stem; light-shaded forms are based on the Weakest stem; dark-shaded forms are based on the Middle stem.

Although they exhibit extensive stem alternation, the masculine and neuter paradigms of PRATYAÑC are not heteroclite: all of their forms follow the general consonant-stem declension.[18] Even so, rules of paradigm linkage might be invoked to account for the observed pattern of stem alternation. On the assumption that PRATYAÑC's root is its Strong stem *pratyañc*, the rule of paradigm linkage in 5 entails that forms built upon this Strong stem will appear by default in PRATYAÑC's paradigm. Suppose, now, that the contrasting notions of strong and weak property sets are defined as in 19;[19] in that case, the distribution of forms built on PRATYAÑC's Middle and Weakest coradicals is correctly accounted for by the overriding rules of paradigm linkage in 20a,b (where the property mapping $f_1$ is as in 10).

(19) Definition of 'strong' and 'weak' property sets: Where $\alpha$ is masculine or feminine, $\beta$ is any direct case (nominative, vocative, or accusative), and $\gamma$ is any number (singular, dual, or plural),
a. instances of $\{\alpha\ \beta\ \gamma\}$ and {neuter $\beta$ plural} are STRONG by default;
b. but instances of $\{\alpha$ accusative plural} are WEAK; in addition,
c. any gender/case/number combination that is not strong according to (a) is WEAK.

(20) Sanskrit rules of paradigm linkage:
a. Where L is a nominal lexeme having $s_w$ as its Weakest coradical and $\sigma$ is a weak property set, if the realization of the form-cell $\langle s_w, f_1(\sigma) \rangle$ is $s_w$[vowel]X, then the content-cell $\langle L, \sigma \rangle$ has $\langle s_w, f_1(\sigma) \rangle$ as its form-correspondent.
b. If L is a nominal lexeme having $s_m$ as its Middle coradical and $\sigma$ is a weak property set, then the content-cell $\langle L, \sigma \rangle$ has $\langle s_m, f_1(\sigma) \rangle$ as its form-correspondent.

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[18] The feminine paradigm of PRATYAÑC is, however, based on the stem *pratīcī*, which does not participate in the pattern of stem alternation exemplified in Table 9 but instead follows the derivative *ī*-stem declension. This declension is frequently 'recruited' for the expression of feminine gender in Sanskrit; see §4.2 for discussion of this notion of recruitment.

[19] Clauses (a) and (b) in definition 19 appear to be contradictory; but because 19b is the more narrowly applicable of the two clauses, it overrides 19a, in accordance with Pāṇini's principle.

Together, 20a and 20b apparently cause any cell in PRATYAÑC's content-paradigm that has a form-correspondent containing the Weakest coradical to have a second, competing form-correspondent containing the Middle coradical. But on the assumption that Pāṇini's principle regulates the interaction of rules of paradigm linkage, 20a will, as the narrower of the two rules, override 20b in any instance in which the former rule is applicable (i.e. in the 'weakest cases', whose realization involves a vowel-initial case suffix).[20]

The rules of paradigm linkage in 20 are independently motivated by the need to account for the pattern of stem alternation in nonheteroclite paradigms such as the masculine and neuter paradigms of PRATYAÑC. As they are, however, they also account for the patterns of declension-class alternation exhibited by heteroclite nouns such as AHAN 'day' (Table 10). The paradigm of AHAN is built on three stems: *ahan* and its zero-grade counterpart *ahn* inflect according to the neuter *an*-stem declension, while *ahas* inflects according to the neuter *as*-stem declension. It would be messy to state the paradigmatic distribution of these stems purely in terms of the morphosyntactic properties with which they are associated; but their distribution follows directly from the rules of paradigm linkage in 20 if *ahan* is identified as AHAN's root (= its Strong stem), *ahas* as its Middle coradical, and *ahn*[21] as its Weakest coradical.[22]

This example reveals the fundamental similarities and differences between morphosyntactically conditioned and morphologically conditioned heteroclisis.[23] Both sorts of heteroclisis involve a lexeme having a root and at least one coradical belonging to distinct inflection classes; both involve a rule of paradigm linkage specifying the contexts in which the lexeme's content-paradigm draws its realizations from the form-paradigm of the coradical rather than from that of the root. In the paradigm-linkage approach, however, there is a fundamental difference between morphosyntactically conditioned and morphologically conditioned heteroclisis: instances of the latter involve rules of paradigm linkage that (like those in 20) define an independent pattern of stem alternation whose incidence does not always involve heteroclisis.

**3.3.** HETEROCLISIS AND DEPONENCY. The paradigm-linkage approach also accounts straightforwardly for the cooccurrence of heteroclisis and deponency. In instances of

[20] In PRATYAÑC's feminine inflection, the rules in 20 are overridden by a rule of paradigm linkage by which any feminine content-cell $\langle \text{PRATYAÑC}, \sigma \rangle$ has $\langle \text{pratīcī}, f_1(\sigma) \rangle$ as its form-correspondent; cf. n. 18.

[21] The identification of *ahn* as AHAN's Weakest coradical need not be stipulated lexically, since it follows from a default rule of stem indexing that is independently needed in Sanskrit; see Stump 2001:186ff. for discussion.

[22] In the *an*-stem declensions, the Strong stem optionally appears in the locative singular; thus, the locative singular forms *nāmni* and *ahni* in Table 10 have *nāmani* and *ahani* as optional alternants. In addition, members of the neuter *an*-stem declension optionally have the Strong stem in their dual direct-case form; thus, the dual direct-case forms *nāmnī* and *ahnī* have *nāmanī* and *ahanī* as alternants. This variation implies the following optional rules of paradigm linkage.

   (i) Where L is a nominal lexeme whose Strong stem r belongs to an *an*-stem declension, if $\sigma$ = {locative singular X}, then the content-cell $\langle \text{L}, \sigma \rangle$ optionally has $\langle \text{r}, f_1(\sigma) \rangle$ as its form-correspondent.

  (ii) Where L is a nominal lexeme whose Strong stem r belongs to the neuter *an*-stem declension, if $\sigma$ = {$\alpha$ dual X} for some direct case $\alpha$, then the content-cell $\langle \text{L}, \sigma \rangle$ optionally has $\langle \text{r}, f_1(\sigma) \rangle$ as its form-correspondent.

Note that even with respect to these instances of optionality, the rules of paradigm linkage relevant to the definition of AHAN's heteroclite paradigm are independently needed for the definition of nonheteroclite paradigms (such as that of NĀMAN).

[23] Sanskrit presents numerous comparable instances of morphologically conditioned heteroclisis, for example those of ASTHI 'bone', AKṢI 'eye', DADHI 'curds', SAKTHI 'thigh', PANTHAN 'road', and so on.

| | | NĀMAN (n.) 'name' | AHAN (n.) 'day' | | MANAS (n.) 'mind' |
|---|---|---|---|---|---|
| DECLENSION: | | NEUTER *an*-STEM | | | NEUTER *as*-STEM |
| Singular | NOM, VOC, ACC | nāma | | ahas | manas |
| | INSTR | nāmnā | ahnā | | manasā |
| | DAT | nāmne | ahne | | manase |
| | ABL, GEN | nāmnas | ahnas | | manasas |
| | LOC | nāmni | ahni | | manasi |
| Dual | NOM, VOC, ACC | nāmnī | ahnī | | manasī |
| | INSTR, DAT, ABL | nāmabhyām | | ahobhyām | manobhyām |
| | GEN, LOC | nāmnos | ahnos | | manasos |
| Plural | NOM, VOC, ACC | nāmāni | ahāni | | manāṃsi |
| | INSTR | nāmabhis | | ahobhis | manobhis |
| | DAT, ABL | nāmabhyas | | ahobhyas | manobhyas |
| | GEN | nāmnām | ahnām | | manasām |
| | LOC | nāmasu | | ahaḥsu | manaḥsu |

TABLE 10. Heteroclite inflection of Sanskrit AHAN 'day' (Whitney 1889:§§414, 424, 430).

deponency, morphology that is ordinarily used in the inflection of forms possessing one morphosyntactic property is instead used in the inflection of forms possessing some contrasting property; though deponency and heteroclisis are logically independent phenomena, it is not unusual to find paradigms that are both deponent and heteroclite. Thus, consider the case of Old English preterite-present verbs—for example, the verb WITAN 'know' (Table 11). In the present tense, WITAN generally exhibits the past-tense morphology typical of a strong verb such as DRĪFAN 'drive'.[24] In the past tense, WITAN exhibits the past-tense morphology typical of weak verbs (e.g. the verb HǢLAN 'heal'). The inflection of WITAN is deponent, since it exploits past-tense morphology in the formation of its present-tense paradigm; it is, at the same time, heteroclite, because it exploits the morphology of strong verbs in one part of its paradigm and that of weak verbs in the other part.

　In the paradigm-linkage approach, there is an important similarity between heteroclisis and deponency: both involve an override of the default rule in 5 by a language-specific rule of paradigm linkage. (Recall, for example, that in the inflection of the Latin verb FATĒRĪ 'confess', the rule of paradigm linkage in 13 causes the active cells in FATĒRĪ's content-paradigm to have passive form-cells as their form-correspondents.) Moreover, there is no logical reason why a single, overriding rule of paradigm linkage could not simultaneously engender both heteroclisis and deponency. On the assumptions of the paradigm-linkage approach, a rule of paradigm linkage associates a content-cell $\langle L, \sigma \rangle$ with a form-correspondent $\langle s, \tau \rangle$: if s is a coradical belonging to an inflection class distinct from that of L's root, heteroclisis results; if $\tau$ is a property set that contrasts with $\sigma$, deponency results; but nothing excludes the possibility that $\langle s, \tau \rangle$ might coincidentally satisfy both of these conditions.

　Thus, consider again the case of WITAN. On the assumption that WITAN's weak stem *wis* is its root, the default rule of paradigm linkage in 5 correctly associates the past-tense cells in WITAN's content-paradigm with the past-tense cells in *wis*'s form-paradigm; to account for WITAN's present-tense paradigm, however, the overriding rule of paradigm

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[24] The form *wāst* is the only divergence from this regularity: the default second-person singular indicative desinence *-st* is ordinarily overridden by *-e* in the past-tense paradigms of strong verbs.

| | | | DRĪFAN 'drive' | WITAN 'know' | HÆLAN 'heal' |
|---|---|---|---|---|---|
| CONJUGATION: | | | STRONG | | WEAK |
| Present tense | Indicative | 1sg | drīfe | wāt | hæle |
| | | 2sg | drīf(e)st | wāst | hæl(e)st |
| | | 3sg | drīf(e)ð | wāt | hæl(e)ð |
| | | plural | drīfað | witon | hælað |
| | Subjunctive | singular | drīfe | wite | hæle |
| | | plural | drīfen | witen | hælen |
| Past tense | Indicative | 1sg | drāf | | wiste | hælde |
| | | 2sg | drife | | wistest | hældest |
| | | 3sg | drāf | | wiste | hælde |
| | | plural | drifon | | wiston | hældon |
| | Subjunctive | singular | drife | | wiste | hælde |
| | | plural | drifen | | wisten | hælden |

TABLE 11. Heteroclite and deponent inflection of the Old English preterite-present verb WITAN 'know'. Shaded cells in WITAN's paradigm inflect like shaded cells in DRĪFAN's paradigm.

linkage in 21a is necessary. This rule engenders heteroclisis by substituting WITAN's strong coradical *wit* for its root *wis*; at the same time, it engenders deponency by causing WITAN's present-tense content-cells to have *wit*'s past-tense form-cells as their form-correspondents.[25]

> (21) a. Old English rule of paradigm linkage: Where L is a preterite-present verbal lexeme having s as its strong coradical, if $\sigma = \{\text{present X}\}$, then the content-cell $\langle L, \sigma \rangle$ has $\langle s, f_3(\sigma) \rangle$ as its form-correspondent.
>
> b. Definition of the Old English property mapping $f_3$: If $\sigma = \{\text{present X}\}$, then $f_3(\sigma) = \{\text{past X}\}$; otherwise $f_3(\sigma) = \sigma$.

**3.4.** HETEROCLISIS, MORPHOSYNTACTIC PROPERTY NEUTRALIZATION, AND DEFECTIVENESS. The paradigm-linkage approach also affords a straightforward account of the fact that heteroclisis sometimes offsets the effects of morphosyntactic property neutralization. The key observation here is that a morphosyntactic property distinction that is neutralized in the inflection of ordinary lexemes may be preserved in the inflection of a heteroclite lexeme precisely because its inflection involves more than one stem; in particular, the heteroclisis induced by rules of paradigm linkage comparable to 14 may have the effect of counteracting morphosyntactic property neutralizations such as those induced by rules of paradigm linkage comparable to 12.

Sochiapan Chinantec (Oto-Manguean) furnishes a striking example of this sort. In Sochiapan Chinantec, dynamic verbs inflect for person/number agreement principally through the modulation of their stem's tone and stress; Table 12 shows the stem modulation of three verbs.[26] As these examples show, number distinctions are partially neutralized in the inflection of Sochiapan Chinantec verbs (Foris 2000:56): while a verb's content-paradigm can be assumed to distinguish number in all three persons, the associ-

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[25] Rule 21a is itself overridden by a narrower rule, according to which the content-cell $\langle \text{WITAN}, \sigma \rangle$ has $\langle \text{wā}, \sigma \rangle$ as its form-correspondent if $\sigma = \{\text{2nd singular present indicative}\}$.

[26] Sochiapan Chinantec has three simple tones ($/^{\text{H M L}}/$) and four complex tones ($/^{\text{MH LM HL ML}}/$); see Foris 2000:18ff. for details.

ated form-paradigm distinguishes number only in the first person.[27] In formal terms, this means that a content-cell having $\sigma$ as its property set has a form-correspondent whose property set is $f_4(\sigma)$, where the property mapping $f_4$ is defined as in 22a; accordingly, a verb's realizations are, in the default case, determined by the rule of paradigm linkage in 22b.

| | | | PRESENT | FUTURE | PAST | AMBULATIVE | HORTATIVE | EVIDENTIAL | HODERNAL PAST | ANDATIVE | PROHIBITIVE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASS A STEM | 3rd | | ʔlia$^{LM}$ | ʔliá$^{LM}$ | ʔliá$^{L}$ | | ʔlia$^{MH}$ | | ʔliá$^{LM}$ | ʔliá$^{M}$ | —$^{a}$ |
| ʔlia$^{LM}$ 'push | 2nd | | ʔliaʔ$^{LM}$ | | ʔliáʔ$^{H}$ | ʔliaʔ$^{MH}$ | XXX$^{b}$ | ʔliaʔ$^{MH}$ | | ʔliáʔ$^{H}$ | ʔliá$^{M}$ |
| (transitive | 1st | singular | ʔliá$^{ML}$ | | ʔliá$^{L}$ | | ʔliá$^{HL}$ | | | ʔliá$^{L}$ | — |
| inanimate)' | | plural | | | | | | | | | |
| CLASS B STEM | 3rd | | ŋiiʔ$^{ML}$ | | ŋiiʔ$^{L}$ | | ŋiiʔ$^{H}$ | | | ŋiiʔ$^{L}$ | — |
| ŋiiʔ$^{ML}$ 'ignite | 2nd | | | | | | XXX | | | | |
| (transitive | 1st | singular | | | | | ŋiiʔ$^{MH}$ | | | | — |
| inanimate)' | | plural | | | | | | | | | |
| CLASS C STEM | 3rd | | | | | | kuṍu$^{M}$ | | | | — |
| kuõu$^{LM}$ 'sleep | 2nd | | kuõu$^{LM}$ | kuṍu$^{LM}$ | kuṍu$^{M}$ | kuõu$^{MH}$ | XXX | kuõu$^{MH}$ | kuṍu$^{M}$ | | |
| (intransitive | 1st | singular | | | | | kuṍu$^{M}$ | | | | — |
| animate)' | | plural | | | | | | | | | |

TABLE 12. Stem inflection of three Sochiapan Chinantec verbs (Foris 2000:56, 57).

[a] Because hortative morphology is obligatory in nonsecond-person prohibitive forms, such forms exhibit the stem inflection of hortatives (Foris 2000:151).

[b] Here and in Table 13, XXX signifies a potential cell whose actual existence is excluded by independent grammatical factors, for example the language's property cooccurrence restrictions (Stump 2001:41).

(22) a. Definition of the Sochiapan Chinantec property mapping $f_4$: Where $\alpha$ = 2nd or 3rd and $\beta$ = singular or plural, $f_4(\{\alpha\ \beta\ X\}) = \{\alpha\ X\}$; otherwise, $f_4(\sigma) = \sigma$.

   b. Sochiapan Chinantec rule of paradigm linkage: If L is a verbal lexeme having r as its root, then the content-cell $\langle L, \sigma \rangle$ has $\langle r, f_4(\sigma) \rangle$ as its form-correspondent.

Although the property mapping in 22a effects a morphosyntactic property neutralization, this effect is counteracted in the heteroclite inflection of motion verbs.[28] Consider, for example, the paradigm of the verb ɴɪ 'walk' in Table 13: in this paradigm, the singular and first-person plural forms are based on the stem ɲi; the remaining plural

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[27] This mismatch between content and form in Sochiapan Chinantec recalls a comparable mismatch in English: although the paradigm of BE reveals that English verb inflection makes a contentive distinction between three persons, no other verb in the language formally distinguishes three persons anywhere in its paradigm.

[28] Foris (p.c., 2002) has identified sixteen verbs that evince this pattern; their glosses are 'sit', 'walk', 'stand on, stay at', 'stand up', 'lie down', 'enter', 'arrive home', 'arrive at/stay at nonhome', 'arrive at nonhome', 'come nonhome', 'come home', 'go home', 'go nonhome', 'leave', 'fall down', and 'die'.

forms, by contrast, are based on the distinct stem *ŋiitãuʔ*.[29] Neither of these stems has a form-paradigm in which number is distinguished in the second and third persons; but together, they allow every person/number combination in the content-paradigm of ɴɨ to have a distinct realization. In particular, the rules of paradigm linkage in 22b and 23 cause content-cells such as those in 24 to have distinct form-correspondents such as those in 25.

| | | | PRESENT | FUTURE | PAST | AMBULATIVE | HORTATIVE | EVIDENTIAL | HODIERNAL PAST | ANDATIVE | PROHIBITIVE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASS A | Singular | 3rd | ŋɨ^LM | ŋɨ́^LM | ŋɨ́^L | | ŋɨ́^MH | | ŋɨ́^LM | ŋɨ́^M | – |
| | | 2nd | ŋɨ́ʔ^H | | | | XXX | | ŋɨ́ʔ^H | | ŋɨ́^M |
| | | 1st | | | ŋɨ́^L | | | | ŋɨ́^L | | – |
| | Plural | 1st | ŋɨ́^ML | | | | ŋɨ́^HL | | | | |
| CLASS B | Plural | 3rd | | | | ŋii^L tãú̗ʔ^H | | | | | – |
| | | 2nd | | ŋií^H tãú̗ʔ^H | | | XXX | | | | |

TABLE 13. Stem inflection of the heteroclite verbal lexeme ɴɨ 'walk (intransitive animate)' in Sochiapan Chinantec (Foris 2000:75). Disyllabic verbs are restricted to classes B and C (p. 77).

(23) Sochiapan Chinantec rule of paradigm linkage: Where L is a verbal lexeme of the ɴɨ type having s as its plural coradical, if $\sigma = \{$plural $\alpha$ X$\}$ and $\alpha =$ 2nd or 3rd, then the content-cell $\langle L, \sigma \rangle$ has $\langle s, f_3(\sigma) \rangle$ as its form-correspondent.

(24) a. $\langle$ɴɨ, {2nd singular future}$\rangle$   c. $\langle$ɴɨ, {3rd singular future}$\rangle$
    b. $\langle$ɴɨ, {2nd plural future}$\rangle$     d. $\langle$ɴɨ, {3rd singular future}$\rangle$

(25) a. $\langle$ŋɨ, {2nd future}$\rangle$           (realization: ŋɨ́ʔ^H)
    b. $\langle$ŋiitãuʔ, {2nd future}$\rangle$     (realization: ŋií^H tãú̗ʔ^H)
    c. $\langle$ŋɨ, {3rd future}$\rangle$           (realization: ŋɨ́^LM)
    d. $\langle$ŋiitãuʔ, {3rd future}$\rangle$     (realization: ŋii^L tãú̗ʔ^H)

Just as a rule of paradigm linkage that engenders heteroclisis may counteract the effects of a morphosyntactic property neutralization, it may likewise counteract the phenomenon of defectiveness. The paradigm $P_L$ of a lexeme L is defective if one or more of the morphosyntactic property sets that are realized in the paradigms of other lexemes belonging to the same syntactic category as L remain unrealized in $P_L$. There is a close connection between defectiveness and heteroclisis, because speakers may compensate for a paradigm's defectiveness by filling its gaps with forms drawn from a distinct paradigm—forms whose inflection class may contrast with that of the defective paradigm's 'own' forms. Consider, for example, the paradigm of Sanskrit YAKAN 'liver' in Table 14.

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[29] The stems *ŋɨ* and *ŋiitãuʔ* in Table 13 belong to the conjugation classes A and B exemplified in Table 12. Both classes possess a number of subtypes; for this reason, the patterns of stem modulation in Table 13 are not exactly like those of the Class A and B stems in Table 12. Nevertheless, the various subtypes of Class A verbs are alike in exhibiting a pattern of tone/stress marking by which four person-number categories are formally distinguished: first person singular, first person plural, second person, and third person; subtypes of Class B are alike in showing a less differentiated pattern of tone/stress marking in which only third person and nonthird person are formally distinguished; and subtypes of Class C are alike in failing to distinguish person and number by any difference of tone/stress marking. Disyllabic verbs are in general restricted to classes B and C. See Foris 2000:56ff. for discussion.

|  |  | YAKṚT (n.) | YAKAN (n.) | NĀMAN (n.) |
|---|---|---|---|---|
|  |  | 'liver' | 'liver' | 'name' |
|  | DECLENSION: | GENERAL CONSONANT-STEM | *an*-STEM | |
| Singular | NOM, VOC, ACC | yakṛt |  | nāma |
|  | INSTR | yakṛtā | yaknā | nāmnā |
|  | DAT | yakṛte | yakne | nāmne |
|  | ABL, GEN | yakṛtas | yaknas | nāmnas |
|  | LOC | yakṛti | yakni | nāmni |
| Dual | NOM, VOC, ACC | yakṛtī |  | nāmnī, nāmanī |
|  | INSTR, DAT, ABL | yakṛdbhyām | yakabhyām | nāmabhyām |
|  | GEN, LOC | yakṛtos | yaknos | nāmnos |
| Plural | NOM, VOC, ACC | yakṛnti |  | nāmāni |
|  | INSTR | yakṛdbhis | yakabhis | nāmabhis |
|  | DAT, ABL | yakṛdbhyas | yakabhyas | nāmabhyas |
|  | GEN | yakṛtām | yaknām | nāmnām |
|  | LOC | yakṛtsu | yakasu | nāmasu |

TABLE 14. Supplementary heteroclisis in the inflection of Sanskrit YAKAN 'liver' (Whitney 1889:§§398, 432).

The oblique-case forms of YAKAN are based on the root *yakan*, which inflects as a member of the neuter *an*-stem declension (fully exemplified in Table 14 by the paradigm of NĀMAN 'name'). But *yakan* lacks direct-case forms; in their place, direct-case forms of the root *yakṛt* are used. The root *yakṛt* follows the general consonant-stem declension, and unlike *yakan*, it gives rise to a full paradigm of realizations; see again Table 14. Thus, Sanskrit possesses two synonymous lexemes for 'liver', one (YAKAN) seemingly defective, the other (YAKṚT) not.

One might reasonably ask, however, whether the paradigm of YAKAN is genuinely defective: one could instead maintain that YAKAN is heteroclite, building its oblique-case paradigm on the stem *yakan* and its direct-case paradigm on the stem *yakṛt*. Clearly, a larger issue is at stake here: can a single form-cell (e.g. ⟨yakṛt, {neuter [nominative ∨ accusative] singular}⟩) serve as the form-correspondent of cells belonging to two different content-paradigms (e.g. the content-cells ⟨YAKAN, {neuter nominative singular}⟩ and ⟨YAKṚT, {neuter nominative singular}⟩)? If so, then the stem *yakṛt* may be assumed to function both as the root of the lexeme YAKṚT and as the coradical of the lexeme YAKAN (root: *yakan*); in the latter instance, the rule of paradigm linkage in 26 draws upon the cells in *yakṛt*'s form-paradigm in the realization of YAKAN's content-paradigm. (Rule 26 also enters into the realization of certain other heteroclites whose behavior parallels that of YAKAN, for example, ASAN 'blood', ŚAKAN 'ordure', ĀSAN 'mouth', UDAN 'water', DOṢAN 'forearm', and YŪṢAN 'broth'; Whitney 1889:§432.)

(26) Sanskrit rule of paradigm linkage: Where L is a verbal lexeme L that belongs to the YAKAN class and has s as its coradical, if σ = {α X} for some direct case α, then the content-cell ⟨L, σ⟩ has ⟨s, $f_1(\sigma)$⟩ as its form-correspondent.

This analysis implies a general distinction between two sorts of heteroclisis. In instances of NONOVERLAPPING HETEROCLISIS, two or more distinct form-paradigms participate in defining the realization of a single content-paradigm. An example is the heteroclisis of Sanskrit AHAN 'day' (Table 10): the form-paradigms of the stems *ahan* and *ahas* participate in the definition of AHAN's content-paradigm and of no other. In instances of OVERLAPPING HETEROCLISIS, by contrast, a form-paradigm serves double duty, participating both in the realization of a nonheteroclite content-paradigm and

(together with one or more other form-paradigms) in the realization of a second, heteroclite content-paradigm; the heteroclisis of YAKAN is of this latter type.[30]

Summarizing, the paradigm-linkage approach to heteroclisis proposed here correctly represents inflection-class membership as a property of stems (= roots and coradicals) rather than of lexemes, and by drawing a distinction between a lexeme's content-paradigm and a stem's form-paradigm, it correctly allows stems belonging to more than one inflection class to participate in the definition of a single lexeme's realizations. This approach readily accounts for the distinction between morphosyntactically conditioned and morphologically conditioned heteroclisis, for the fact that deponency and heteroclisis frequently coincide, and for the fact that heteroclisis sometimes counteracts the effects of morphosyntactic property neutralization and defectiveness. As I now show, the paradigm-linkage approach is strongly motivated by two kinds of evidence: the incidence of systematic heteroclisis and the existence of a universal constraint on heteroclisis.

**4.** SYSTEMATIC HETEROCLISIS. In the clearest, canonical instances of heteroclisis, the inflection classes participating in the definition of a heteroclite lexeme's paradigm P are competitors, in the sense that a single stem belonging to either class could inflect for the full range of morphosyntactic property sets in P; for instance, the soft-masculine and hard-masculine declension classes that participate in defining the paradigm of Czech PRAMEN (Table 1) are competitors, since the noun POKOJ 'room' builds its entire paradigm on a soft-masculine stem, and the noun MOST 'bridge' builds its entire paradigm on a hard-masculine stem. There are, however, less canonical instances of heteroclisis in which the juxtaposed inflection classes are not competitors at all, or compete only in certain contexts;[31] I discuss several examples of such noncanonical patterns of heteroclisis in this section. As I show, these differ from canonical instances of heteroclisis in a second way as well. Canonically heteroclite patterns of inflection tend to be unsystematic or exceptional in the sense that they are embodied by only a handful of paradigms; thus, if all heteroclisis were canonical, the lexical approach to heteroclisis in 1 might seem like a viable mode of analysis. But less canonically, heteroclisis may play a central role in an inflectional system's definition, in that each member of an entire class of lexemes may involve more than one inflection class in its realization. Instances of this sort cannot be plausibly accounted for by means of piecemeal lexical stipulations such as those in 2, but instead necessitate the postulation of rules of more general scope; such instances therefore favor the paradigm-linkage approach to heteroclisis advocated here.

In this section, I discuss two main types of noncanonical heteroclisis: (i) heteroclisis involving noncompeting inflection classes (§4.1) and (ii) heteroclisis involving inflection classes that are in partial competition (§4.2). Heteroclisis of type (i) may be of two subtypes, according to whether the juxtaposed inflection classes are associated with distinct morphosyntactic properties or with distinct syntactic contexts. Heteroclisis of type (ii) may also be of two subtypes, according to whether the competition of the juxtaposed inflection classes is conditioned lexically or morphosyntactically.

I emphasize that in the following discussion, the term 'heteroclisis' is to be understood as referring to the property of any lexeme whose inflectional paradigm contains forms built upon stems belonging to two or more distinct inflectional classes, whether

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[30] The terminological distinction proposed here is meant to recall the parallel distinction between nonoverlapping and overlapping suppletion made by Juge (1999:186).

[31] 'Less canonical' does not, of course, mean 'less usual'. See Corbett 2003 for discussion of the canonical approach in linguistic typology.

or not these classes are full competitors and whether or not the juxtaposition of these classes is systematic. This is, in a sense, a departure from ordinary usage, in which heteroclisis tends to be equated with what I am calling canonical heteroclisis (the juxtaposition of competing inflectional classes in certain sporadic paradigms).

**4.1.** SYSTEMATIC HETEROCLISIS INVOLVING NONCOMPETING INFLECTION CLASSES. When stems belonging to noncompeting inflection classes participate in the definition of a lexeme's paradigm, the choice among these stems may be determined by the morpho-syntactic property set to be realized or by the syntactic context in which the realization is to be used. In this section, I discuss instances of heteroclisis of both of these sorts. As I show, both are characteristically systematic and therefore favor the paradigm-linkage approach to heteroclisis over the lexical approach.

THE PRINCIPAL-PARTS PHENOMENON. In the simplest systems of inflection classes, the entire paradigm of a lexeme L may be determined by the membership of L's root in a particular inflection class; in English, for example, the entire paradigm of the lexeme WALK is determined by the membership of the root *walk* in the class of weak verbs. But a lexeme's paradigm is not always fully deducible from the membership of its root in a particular inflection class. In Sanskrit, for instance, the fact that the root *bhrāj* of the lexeme BHRĀJ 'shine' belongs to the first conjugation accounts for the morphological realization of BHRĀJ's 'present-system' forms (i.e. its present indicative, present optative, imperfect, and imperative forms), but not, for example, for that of its aorist forms (which follow the root-aorist conjugation). Indeed, the pattern of aorist inflection exhibited by BHRĀJ is shared by verbs whose present-system inflection follows a conjugation other than the first (e.g. HRĪ 'be ashamed' [3rd conjugation], SAGH 'be equal to' [5th conjugation], GUR 'greet' [6th conjugation], and TRD 'split, bore' [7th conjugation]); by the same token, several first-conjugation verbs form their aorist differently from BHRĀJ (e.g. DHVAS 'scatter' [*a*-aorist conjugation], KLP 'be adapted' [reduplicated aorist conjugation], RAKS 'protect' [*s*-aorist conjugation], ŚAṄK 'doubt' [*is*-aorist conjugation], and KRUŚ 'cry out' [*sa*-aorist conjugation]). Thus, in general, the inflection-class membership that determines a Sanskrit verb's present-system inflection neither predicts nor is predicted by the inflection-class membership that determines its aorist inflection.[32]

To account for such instances, traditional grammarians have customarily associated a lexeme with a set of PRINCIPAL PARTS: a set of forms realizing that lexeme which only jointly determine the entirety of its paradigm. Traditional grammarians have generally assumed that each of a lexeme's principal parts is a fully inflected word, but one could just as easily assume that it is a stem from which some part of the lexeme's paradigm is deducible. The principal parts of Sanskrit BHRĀJ, for example, might be assumed to include the first-conjugation present-system stem *bhrāja* and the root-aorist stem *bhrāj*.

This principal-parts phenomenon is one kind of systematic heteroclisis. Given any lexeme L, L is by definition heteroclite if stems belonging to two or more distinct inflection classes participate in the definition of L's paradigm. In canonical heteroclisis, the participating inflection classes are competitors in the sense that for each one of

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[32] There are, to be sure, occasional correlations between present-system and aorist-system inflection classes in Sanskrit; for instance, verbal lexemes following the tenth conjugation in the present system generally also follow the reduplicated aorist conjugation (although the reverse is not invariably true; Stump 2005a). The existence of such correlations does not, however, alter the fact that in general, a verb's present-system inflection and its aorist-system inflection are mutually unpredictable.

these classes, there are nonheteroclite lexemes that build their entire paradigm on a stem belonging to that class. But in instances of the principal-parts phenomenon, the participating classes are complementary rather than competing:[33] for each cell $\langle L, \sigma \rangle$ in L's paradigm, the rules available to realize $\sigma$ never make essential reference to more than one of the participating classes. In Sanskrit, for example, rules realizing instances of the property set {aorist X} never refer to the inflection classes in 27, only to those in 28; similarly, rules realizing instances of the property sets {present X} or {imperfect X} never refer to the inflection classes in 28, only to those in 27.[34] Thus, in the principal-parts phenomenon, we have heteroclisis involving noncompeting inflection classes.

(27) Present-system inflection classes

| 1st conjugation | 6th conjugation |
| 2nd conjugation | 7th conjugation |
| 3rd conjugation | 8th conjugation |
| 4th conjugation | 9th conjugation |
| 5th conjugation | 10th conjugation |

(28) Aorist inflection classes

root-aorist
*a*-aorist
reduplicated aorist
*s*-aorist
*iṣ*-aorist
*siṣ*-aorist
*sa*-aorist

The paradigm-linkage approach to heteroclisis—unlike the lexical approach—affords a general account of the principal-parts phenomenon. Suppose that L is a lexeme belonging to a syntactic category whose members exhibit the principal-parts phenomenon. In any such instance, L is subject to a different rule of paradigm linkage for each of its principal parts. The Sanskrit lexeme BHRĀJ, for example, is subject to rules such as 29a,b.

(29) Sanskrit rules of paradigm linkage:
   a. Where L is a verbal lexeme having s as its present-system coradical, if $\sigma$ = {present X} or {imperfect X}, then $\langle L, \sigma \rangle$ has $\langle s, \sigma \rangle$ as its form-correspondent.
   b. Where L is a verbal lexeme having s as its aorist-system coradical, if $\sigma$ = {aorist X}, then $\langle L, \sigma \rangle$ has $\langle s, \sigma \rangle$ as its form-correspondent.

Where $\sigma$ is an instance of {present X}, 29a entails that the realization of the content-cell $\langle$BHRĀJ, $\sigma \rangle$ is that of the form-cell $\langle$bhrāja, $\sigma \rangle$, where *bhrāja* is a member of the first conjugation; where $\sigma$ is an instance of {aorist X}, 29b entails that the realization of $\langle$BHRĀJ, $\sigma \rangle$ is that of $\langle$bhrāj, $\sigma \rangle$, where *bhrāj* is a member of the root-aorist conjugation; and so on. Mere lexical stipulations such as 2 would fail to capture the systematic generalizations expressed by 29.

SYNTACTICALLY CONDITIONED INFLECTION CLASSES. In instances of the principal-parts phenomenon, the juxtaposed inflection classes are associated with contrasting morpho-syntactic property sets; in the inflection of the Sanskrit verb BHRĀJ 'shine', for instance, the first conjugation (to which the stem *bhrāja* belongs) and the root-aorist conjugation (to which *bhrāj* belongs) are associated with the respective property sets specified in

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[33] On this view, it is misleading to characterize a heteroclite paradigm as a 'mixed' paradigm: if a paradigm is heteroclite because it embodies the principal-parts phenomenon, then all paradigms belonging to the same category will be similarly heteroclite; that is, there simply won't be any 'unmixed' paradigms of that category. Nevertheless, even a paradigm embodying the principal-parts phenomenon involves a contrast between default and intrusive inflection classes (in the sense of the criteria given in 16).

[34] These statements are, I would argue, true even in the case of verbs whose present-system inflection follows the tenth conjugation and whose aorist-system inflection follows the reduplicated-aorist conjugation (cf. n. 32), since the correlation between these two conjugations is not both a necessary and a sufficient one.

29a,b. But heteroclisis may also involve the juxtaposition of noncompeting inflection classes distinguished by their association with contrasting syntactic contexts. A familiar example of this type of heteroclisis is that of German adjectival declension. In German, adjectives inflect according to three different declensions: the strong, the mixed, and the weak. Each declension supplies a form for each gender/case combination in the singular and a gender-neutral form for each case in the plural; the paradigms of GUT 'good' in Table 15 illustrate. As its name implies, the mixed declension is heteroclite: it follows the strong declension in the singular of the direct cases, and otherwise the weak declension. Even though all three declensions supply realizations for the same morphosyntactic property sets, they are not in competition, since their realizations are associated with complementary syntactic contexts. In attributive position, strong-declension forms are used in the absence of a determiner;[35] weak-declension forms are used in the presence of a subclass of determiners including DIES 'this'; and mixed-declension forms are used in the presence of a distinct subclass of determiners including the indefinite article EIN.

| | STRONG | | | | MIXED | | | | WEAK | | | |
| | SINGULAR | | | PLURAL | SINGULAR | | | PLURAL | SINGULAR | | | PLURAL |
| | MASC | NEUT | FEM | | MASC | NEUT | FEM | | MASC | NEUT | FEM | |
| NOM | guter | gutes | gute | gute | guter | gutes | gute | guten | gute | gute | gute | guten |
| ACC | guten | gutes | gute | gute | guten | gutes | gute | guten | guten | gute | gute | guten |
| GEN | guten | guten | guter | guter | guten | guten | guten | guten | guten | guten | guten | guten |
| DAT | gutem | gutem | guter | guten | guten | guten | guten | guten | guten | guten | guten | guten |

TABLE 15. Strong, mixed, and weak declensions of GUT 'good' in German.

Because the heteroclisis of the mixed declension is completely systematic, involving every adjective in the language, the lexical approach to heteroclisis does not afford a plausible framework for its grammatical representation. The paradigm-linkage approach does. On this latter approach, German adjectives are uniformly subject to the rule of stem inference in 30. Given any adjectival lexeme L having r as its (weak-declension) root and s as its (strong-declension) coradical, the content-cell $\langle L, \sigma \rangle$ has both $\langle r, \sigma \rangle$ and $\langle s, \sigma \rangle$ as form-correspondents: the first of these is the default form-correspondent supplied by rule 5, while the latter is supplied by a language-specific rule of paradigm linkage. In order to account for the fact that an adjectival lexeme's two stems yield complementary rather than competing word forms, I assume that the latter rule itself imposes a contextual restriction on the realizations of an adjectival lexeme's coradical, as in 31. In accordance with 31a, realizations of strong form-cells are used in determiner-free contexts; in accordance with 31b, realizations of strong, singular, direct-case form-cells are also used in the context of EIN-type determiners; and by default, realizations of weak form-cells are used everywhere else.

(30) German rule of stem inference: If an adjectival lexeme L has a root r belonging to the weak declension, L also has an otherwise identical coradical belonging to the strong declension.

(31) German rule of paradigm linkage: If L is an adjectival lexeme having s as its strong-declension coradical, then the content-cell $\langle L, \sigma \rangle$ has $\langle s, \sigma \rangle$ as a form-correspondent, whose realization is used attributively:
a. in determiner-free contexts, and

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[35] Adjectives in predicative position are not declined in German.

    b. in the context of EIN-type determiners, provided that σ = {α singular X}
       for some direct case α.

In summary, noncompeting inflection classes may be juxtaposed within a single paradigm in either of two ways: noncompeting classes may be associated with contrasting morphosyntactic properties (the principal-parts phenomenon) or with complementary syntactic contexts. Heteroclisis involving either sort of juxtaposition is not exceptional at all, but highly systematic in those languages in which it appears. An adequate account of either sort of juxtaposition involves generalizations over entire classes of lexemes, necessitating the sorts of rules afforded by the paradigm-linkage approach to heteroclisis.

**4.2.** SYSTEMATIC HETEROCLISIS INVOLVING PARTIALLY COMPETING INFLECTION CLASSES. Canonical instances of heteroclisis (in which a lexeme's inflection depends on stems belonging to two or more fully competing inflection classes) and heteroclisis involving noncompeting inflection classes (§4.1) are at opposite extremes of a continuum: that is, there are 'intermediate' instances of heteroclisis involving inflection classes that are in partial but not full competition. As I show here, instances of this sort are of two kinds, according to whether the competition of the juxtaposed inflection classes is restricted morphosyntactically or lexically. These, too, motivate the paradigm-linkage approach to heteroclisis.

DEFECTIVE INFLECTION CLASSES. Some paradigms are heteroclite because members of one inflection class systematically inflect as members of a distinct class in the realization of particular morphosyntactic property sets. Consider, for example, the inflection of Sanskrit aorists. In Sanskrit, there are seven aorist conjugation classes (those listed in 28). Each exhibits a distinct pattern of inflection in the aorist active. In the middle voice, however, a verb belonging to the root-aorist conjugation (whose forms lack any stem-forming suffix) instead follows either the *s*-aorist conjugation (in which the stem has an -*s* suffix) or the *iṣ*-aorist conjugation (in which the stem has an -*iṣ* suffix)—the former if the verb belongs to Pāṇini's *aniṭ* class, the latter if it belongs to the *seṭ* class. The active inflection of the verb DĀ 'give', for example, follows the root-aorist conjugation, but its middle inflection instead follows the *s*-aorist conjugation (Table 16). Similarly, verbs belonging to the *siṣ*-aorist conjugation follow the *s*-aorist conjugation in the middle voice, and most verbs belonging to the *a*-aorist conjugation inflect as members of the *s*- or *iṣ*-aorist conjugation in the middle voice.

| AORIST CONJUGATION: | | DĀ 'give' ROOT-AORIST | | | NĪ 'lead' *s*-AORIST | | |
|---|---|---|---|---|---|---|---|
| | | SINGULAR | DUAL | PLURAL | SINGULAR | DUAL | PLURAL |
| Active | 1st | adām | adāva | adāma | anaiṣam | anaiṣva | anaiṣma |
| | 2nd | adās | adātam | adāta | anaiṣīs | anaiṣṭam | anaiṣṭa |
| | 3rd | adāt | adātām | adus | anaiṣīt | anaiṣṭām | anaiṣus |
| Middle | 1st | adiṣi | adiṣvahi | adiṣmahi | aneṣi | aneṣvahi | aneṣmahi |
| | 2nd | adithās[a] | adiṣāthām | adiḍhvam | aneṣṭhās | aneṣāthām | aneḍhvam |
| | 3rd | adita[a] | adiṣātām | adiṣata | aneṣṭa | aneṣātām | aneṣata |

TABLE 16. Heteroclite inflection of Sanskrit DĀ 'give' (Whitney 1889:§§829, 882). Shaded words inflect as members of the *s*-aorist conjugation.

[a] Regarding the absence of stem-final *s* in the 2nd- and 3rd-person singular aorist middle forms of DĀ, see Whitney 1889:§§881c, 884.

In heteroclite paradigms such as that of DĀ, the participating inflection classes are only partial competitors: they are alternatives in the active voice, but not in the middle voice. In particular, they are partial competitors because the root-aorist conjugation is a DEFECTIVE INFLECTION CLASS: it does not furnish realizations for all of the morphosyntactic property sets for which the *s*-aorist does. Note that saying that a paradigm involves a defective inflection class is not the same thing as saying that it is a defective paradigm; the paradigm of DĀ, for instance, is not defective. Note, too, that inflection-class defectiveness is different from the phenomenon of default inflectional patterns discussed in §2. It is not simply that the root aorist and the *s*-aorist share a default pattern of inflection for middle forms: in middle paradigms such as that of DĀ, the root aorist is clearly giving way to the *s*-aorist, since the forms exhibit a stem-final *s* (or one of its sandhi alternants)—the defining mark of the *s*-aorist.

In the paradigm-linkage approach to heteroclisis, such inflection-class dependencies can be straightforwardly attributed to the interaction of rules of stem inference with rules of paradigm linkage. Suppose, for instance, that if a Sanskrit verbal lexeme has s as its aorist stem, then it is assigned an aorist middle coradical s′, whose form and inflection-class membership are determined from s by the rule of stem inference in 32; on that assumption, the properties of aorist middle forms follow from the rule of paradigm linkage in 33.

> (32) Sanskrit rule of stem inference: Where lexeme L has s as its aorist stem, its aorist middle coradical s′ is like s, except that if s belongs to the root-, *siṣ*-, or *a*-aorist conjugation, then
>   a. if s belongs to the *seṭ* class,
>      then s′ belongs to the *iṣ*-aorist conjugation, and
>   b. otherwise s′ belongs to the *s*-aorist conjugation.

> (33) Sanskrit rule of paradigm linkage: Where L is a verbal lexeme having s as its aorist middle coradical, if $\sigma = \{$aorist middle X$\}$, then the content-cell $\langle L, \sigma \rangle$ has $\langle s, \sigma \rangle$ as its form-correspondent.

RECRUITED INFLECTION CLASSES. In the foregoing example of partial competition among inflection classes, the competition is partial because one of the participating inflection classes is defective; the contexts in which no competition takes place can therefore be characterized in morphosyntactic terms (as in 33). There are, however, instances of partial competition that do not involve inflection-class defectiveness and in which the lack of competition is associated with lexical contexts rather than with a morphosyntactic context. These involve RECRUITED INFLECTION CLASSES, which function as ordinary inflection classes in some paradigms but which take on a specific morphosyntactic function in others.

Heteroclisis involving recruited inflection classes often arises in languages with both gender distinctions and declension-class distinctions. In such languages, members of particular declension classes may, by default, be assigned to particular gender classes (Corbett 1991:33ff.), and if an adjective's stems are subject to such default gender assignments, then in the inflection of that adjective, declension-class distinctions are in effect recruited for the expression of gender distinctions. Consider, for example, the inflection of adjectives in Ancient Greek. In Ancient Greek, members of the general *o*-stem declension exemplified by the paradigm of HIPPOS 'horse' in Table 17 are masculine by default (though a small number of feminine nouns also follow this declension); members of the contrasting *o*-stem declension exemplified by the paradigm of DÔRON 'gift' in Table 17 are invariably neuter; and members of the feminine *ā*-stem declension

exemplified by the paradigm of CHÔRĀ 'land' in Table 17 are invariably feminine.[36] Accordingly, these three declension classes are recruited for the systematic expression of a three-way gender contrast in the inflection of Ancient Greek adjectives with stem-final $o$ (Jannaris 1968:139f.); thus, the inflection of the adjective AXIOS 'worthy' in Table 17 is heteroclite, following the HIPPOS-type declension in its masculine subparadigm, the DÔRON-type declension in its neuter subparadigm, and the CHÔRĀ-type declension in its feminine subparadigm. This is the regular pattern of inflection for vast numbers of $o$-stem adjectives. Because the HIPPOS-type declension includes some feminine nouns (e.g. PARTHENOS 'maiden', HODOS 'road'), the general $o$-stem and feminine $\bar{a}$-stem declensions are competitors in the inflection of feminine nouns; but in the inflection of an adjective belonging to the AXIOS class, these two declensions are not in competition precisely because they are recruited to express contrasting genders.

|  |  | HIPPOS (m.) 'horse' | DÔRON (n.) 'gift' | CHÔRĀ (f.) 'land' | AXIOS 'worthy' | | |
|  |  |  |  |  | MASC | NEUT | FEM |
| DECLENSION: |  | GENERAL $o$-STEM | NEUTER $o$-STEM | FEMININE $\bar{a}$-STEM | GENERAL $o$-STEM | NEUTER $o$-STEM | $\bar{a}$-STEM |
| Singular | NOM | hippos | dôron | chôrā | axios | axion | axiā |
|  | GEN | hippou | dôrou | chôrās | axiou | axiou | axiās |
|  | DAT | hippôi | dôrôi | chôrai | axiôi | axiôi | axiai |
|  | ACC | hippon | dôron | chôrān | axion | axion | axiān |
|  | VOC | hippe | dôron | chôrā | axie | axion | axiā |
| Dual | N. A. V. | hippô | dôrô | chôrā | axiô | axiô | axiā |
|  | G. D. | hippoin | dôroin | chôrain | axioin | axioin | axiain |
| Plural | N. V. | hippoi | dôra | chôrai | axioi | axia | axiai |
|  | GEN | hippôn | dôrôn | chôrôn | axiôn | axiôn | axiôn |
|  | DAT | hippois | dôrois | chôrais | axiois | axiois | axiais |
|  | ACC | hippous | dôra | chôrās | axious | axia | axiās |

TABLE 17. Declension of three nouns and the adjective AXIOS 'worthy' in Ancient Greek.

The paradigm-linkage approach to heteroclisis affords a general account of such gender-bound heteroclisis in the declension of adjectives. For instance, on the assumption that AXIOS's root is its masculine stem $axio_1$ (a member of the general $o$-stem declension), the form and inflection-class membership of its neuter and feminine coradicals can be predicted by a rule of stem inference.[37]

> (34) Greek rule of stem inference: If an adjectival lexeme's root X$o$ belongs to the general $o$-stem declension, then its otherwise identical neuter coradical belongs to the neuter $o$-stem declension and its feminine coradical X$\bar{a}$ belongs to the feminine $\bar{a}$-stem declension.

Given this rule, the adjectival lexeme AXIOS is then subject to the two rules of paradigm linkage in 35 and to 5 as well. Rule 5 defines AXIOS's masculine subparadigm: where σ is an instance of {masculine X}, 5 entails that the realization of the content-cell

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[36] Certain masculine nouns (e.g. NEĀNIĀS (m.) 'young man') have stems in $\bar{a}$, but they follow the masculine $\bar{a}$-stem declension, which differs from that of CHÔRĀ in the nominative and genitive singular.

[37] Certain adjectives having stems in $o$ follow the general $o$-stem declension in both the masculine and feminine genders, for example BARBAROS 'foreign', HĒMEROS 'tame'; indeed, this is quite generally true of compound $o$-stem adjectives, for example ADIKOS 'unjust', EUPHŌNOS 'sonorous' (Jannaris 1968:142). In the inflection of such 'adjectives of two endings', rule 34 is overridden by a more narrowly applicable rule of stem inference equating the feminine stem with the masculine stem.

⟨AXIOS, σ⟩ is that of the form-cell ⟨axio₁, σ⟩. The rules of paradigm linkage in 35a,b define its neuter and feminine subparadigms, respectively: where σ is an instance of {neuter X}, 35a entails that the realization of ⟨AXIOS, σ⟩ is that of ⟨axio₂, σ⟩, where by 34, *axio₂* is a member of the neuter *o*-stem declension; and where σ is an instance of {feminine X}, 35b entails that the realization of ⟨AXIOS, σ⟩ is that of ⟨axiā, σ⟩, where *axiā* is a member of the feminine *ā*-stem declension.

(35) Greek rules of paradigm linkage:
    a. If L is an adjectival lexeme having s as its neuter coradical and σ = {neuter X}, then the content-cell ⟨L, σ⟩ has ⟨s, σ⟩ as its form-correspondent.
    b. If L is an adjectival lexeme having s as its feminine coradical and σ = {feminine X}, then the content-cell ⟨L, σ⟩ has ⟨s, σ⟩ as its form-correspondent.

In this section, I have examined various instances of noncanonical heteroclisis in which noncompeting or merely partially competing inflection classes are juxtaposed within an inflectional paradigm. Each of these is distinguished from canonical instances of heteroclisis by its systematicity across an entire lexeme class. The reasons for this systematicity are, in each case, clear. Most obviously, a lexeme whose root belongs to a defective inflection class cannot have a complete paradigm without being heteroclite; thus, heteroclisis must be systematic in languages with defective inflection classes. The same is even more dramatically true in languages exhibiting the principal-parts phenomenon, in which all of the inflection classes relevant for the inflection of stems belonging to a particular syntactic category are in effect defective. If the inflection of some lexeme class depends on a system of syntactically conditioned inflection classes, it is not possible for a member of that lexeme class to be used in the range of expected syntactic contexts unless its paradigm is heteroclite; heteroclisis must therefore be systematic in languages with syntactically conditioned inflection classes. And if certain inflection classes are recruited for the expression of some morphosyntactic distinction in the inflection of some lexeme class, members of that lexeme class must be systematically heteroclite if their paradigms are to reflect that distinction. For representing systematic patterns of inflection-class juxtaposition such as those considered in this section, piecemeal lexical stipulations such as 2 are not a credible alternative to the paradigm-linkage approach, whose rules regulate the realization of whole classes of lexemes.

**5.** A CONSTRAINT ON HETEROCLISIS. The incidence of heteroclisis in an inflectional system reveals an important fact about inflectional paradigms. Like a crystalline mineral, each exhibits a particular pattern of cleavage: just as a mineral may be more likely to split apart along one planar surface than along another, so the splitting of an inflectional paradigm into subparadigms belonging to separate inflection classes may be more likely along one morphosyntactic boundary than along another. In the paradigm of Czech PRAMEN 'spring' (Table 1), the inflection-class split is an especially clean one, separating the singular and plural parts of the paradigm. Splits of this kind are not unusual in Czech: comparable examples are the paradigms of DĚVČE 'girl', DÍTĚ 'child', HŘEBEN 'comb', JEČMEN 'barley', KOŘEN 'root', KŘEMEN 'quartz', PLAMEN 'flame', ŘEMEN 'strap', and so on.

Crystalline minerals don't always break apart along a plane of cleavage; less predictable breaks (called fractures) can also occur. In the same way, many Czech nouns have heteroclite paradigms in which the split between declension classes is not absolutely clean, from a morphosyntactic perspective; examples are the paradigms of the nouns

PŘEDSEDA 'president' and SLUHA 'servant' (Tables 6 and 8). But intuitively, even these paradigms seem to cleave primarily along the number boundary.

In this section, I examine the various ways in which heteroclite paradigms may split into subparadigms belonging to distinct inflection classes. I argue that there is a universal constraint on the coexistence of contrasting patterns of inflection-class split; as I show, this constraint amounts to a well-formedness condition on rules of paradigm linkage. Before proceeding, it is useful to have some precise definitions for distinguishing different types of split.

**5.1.** SOME DEFINITIONS. Consider the heteroclite paradigm of the Czech noun PRAMEN 'spring' (Table 1), whose members inflect as members of two inflection classes (the soft-masculine and hard-masculine declensions) and express two properties (singular, plural) of the inflectional category of number. In this paradigm, the correlation between properties of number and inflection classes is 'perfect': the cells in Table 1 that follow the soft-masculine declension are exactly those that are specified as singular, and those that follow the hard-masculine declension are exactly those that are specified as plural.

As a way of facilitating comparisons between such perfect paradigms and others that are less perfect, I propose the following empirical measure of a heteroclite paradigm's degree of morphosyntactic correlation: given a heteroclite paradigm P and an inflectional category A having $v_1, \ldots, v_m$ as its possible values, the DEGREE OF A-CORRELATION IN P is a ratio x/y, where y is the number of cells in P and x is the sum of $n_1, \ldots, n_m$, where $n_i$ is the largest number of cells in P that carry the specification $v_i$ and inflect as members of the same inflection class. By this measure, the degree of number correlation in the paradigm of PRAMEN is 14/14 (i.e. 1.0), since all seven cells carrying the specification 'singular' inflect as members of the soft-masculine declension and all seven cells carrying the specification 'plural' inflect as members of the hard-masculine declension. By this same mode of calculation, the degree of number correlation is .86 (= 12/14) in the paradigm of PŘEDSEDA 'president' (Table 6), since all seven cells carrying the specification 'plural' inflect as members of the hard-masculine declension and five of the seven cells carrying the specification 'singular' inflect as members of the hard-feminine declension; similarly, the degree of number correlation is .79 (= 11/14) in the paradigm of SLUHA 'servant' (Table 8).

The intuition that these nominal paradigms cleave primarily along the number boundary is confirmed by calculating their degree of case correlation: this amounts to .50 in PRAMEN's paradigm, .64 in PŘEDSEDA's paradigm, and .57 in SLUHA's paradigm; in each paradigm, the degree of number correlation exceeds the degree of case correlation.

In what follows, I refer to an inflectional category A as an ABSOLUTE CORRELATE of a paradigm's heteroclisis if and only if the degree of A-correlation in that paradigm is 1.0; thus, number is an absolute correlate of heteroclisis in the paradigm of PRAMEN. I refer to an inflectional category A as a MAXIMAL CORRELATE of a paradigm's heteroclisis if and only if the degree of A-correlation is higher than any other inflectional category's degree of correlation in that paradigm; thus, number is a maximal correlate of heteroclisis in the paradigms of PŘEDSEDA and SLUHA as well as that of PRAMEN. Finally, I refer to heteroclite paradigms that (like that of PRAMEN) have an absolute correlate as CLOVEN paradigms, and to those that (like those of PŘEDSEDA and SLUHA) lack any absolute correlate as FRACTURED paradigms.[38]

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[38] The incidence of fractured paradigms disconfirms the 'slab codicil' to Carstairs's (1987:81ff.) paradigm economy principle, the antecedent of the no blur principle; cf. n. 5.

**5.2.** A CLOVEN PARADIGM'S ABSOLUTE CORRELATE. It is striking how few inflectional categories appear as absolute correlates of heteroclisis in a given language. This paucity is a reflection of the widely observable tendency in 36.

(36) Cloven paradigms of lexemes belonging to the same syntactic category tend to have the same absolute correlate.

That is, just as some minerals (e.g. covellite or stibnite) always cleave along a single plane, so also the paradigms of heteroclite lexemes belonging to the same syntactic category tend always to cleave in the same direction. For instance, Czech nouns with cloven paradigms have number as their absolute correlate; heteroclite noun paradigms whose inflection-class splits correlate cleanly with any other inflectional category are, to my knowledge, nonexistent in Czech (for instance, there is no nominal paradigm that follows the hard-stem declension in the nominative (singular and plural) but the soft-stem declension elsewhere). Number appears as an absolute correlate of heteroclisis in cloven noun paradigms in many other languages, including Polish (e.g. POETA 'poet', VERNE (proper name)), Lithuanian (e.g. SŌDŽIUS 'village', ŽMOGÙS 'man'), Ancient Greek (e.g. DESMOS 'chain', PRESBEUTÊS 'ambassador'), Latin (e.g. URBS 'city'), and so on. But number is not always the shared absolute correlate in cloven noun paradigms. In Sanskrit, for example, cloven noun paradigms have case as their absolute correlate (e.g. YAKAN 'liver' (Table 14), ASAN 'blood', UDAN 'water', and so on). In Fula, cloven noun paradigms have 'evaluative type' as their absolute correlate: for instance, the noun REE(R) 'belly' follows the A-grade inflection in its evaluative (diminutive and augmentative) forms and the C-grade inflection in its neutral (nonevaluative) forms (Table 18); cf. also SUU(R) 'hut', WAM(B) 'donkey', DAM(B) 'he-goat', and so on (Arnott 1970:120f.).

| | | | TATA6 'third' | REE(R) 'belly' | | 'UNOR 'mortar' |
|---|---|---|---|---|---|---|
| INFLECTIONAL GRADE: Evaluative type: | | | A | | | C |
| Diminutive | singular | (noun class 3) | tata6-el | deer-el | | 'unor-gel |
| | plural | (noun class 6) | tata6-on | ndeer-on | | 'unor-kon |
| Pejorative diminutive | singular | (noun class 5) | tata6-um | deer-um | | 'unor-gum |
| Augmentative | singular | (noun class 7) | tata6-a | ndeer-a | | 'unor-ga |
| | plural | (noun class 8) | tata6-o | ndeer-o | | 'unor-ko |
| Neutral | singular | (noun class 11) | tata6-ru | | ree-du | 'unor-du |
| | plural | (noun class 25) | tata6-i | | dee-di | 'unor-di |

TABLE 18. Heteroclite inflection of Fula REE(R) 'belly' (Arnott 1970:89f., 120f.).

In languages in which members of a particular declension class are assigned by default to a particular gender class, gender is naturally an absolute correlate of heteroclisis in cloven adjectival paradigms; this is true, for example, of the Ancient Greek adjectives considered in §4.2.

In cloven verbal paradigms, the absolute correlate of heteroclisis is often tense (as in the case of Armenian GAL 'come' (Table 24 below), Bulgarian SPI 'sleep', Old English WITAN 'know' (Table 11)) or aspect (as in the case of Hebrew NGŠ 'approach', Latin FERĪRE 'hit'), though other inflectional categories are also observable as absolute correlates, for example, mood (as in the case of Ngiyambaa YANA 'walk' (Donaldson 1980:

158)), finiteness (as in the case of Hausa ɓAMɓÀRĒ 'tear off' (Newman 2000:708)), number (as in the case of Sochiapan Chinantec ʔɪ 'enter'), and so on.

Although it is the norm for cloven paradigms belonging to the same syntactic category to have the same absolute correlate, they don't always. Just as some minerals (e.g. pyrolusite, enargite) may cleave along either of two nonparallel planes, cloven paradigms belonging to the same category occasionally exhibit contrasting absolute correlates. Takelma (Penutian) furnishes a clear case of this sort. In Takelma, the paradigms of certain heteroclite verbs cleave cleanly along the aorist/nonaorist boundary: for example, the verb AL-WEʹKǃAL 'shine' (Table 19[39]) inflects in the aorist as a member of conjugation class III (the usual class for transitive verbs) but inflects elsewhere as a member of class II (that of many intransitive verbs); similarly, the verb WOG 'arrive' (Sapir 1922:166) inflects in the aorist as a member of class II but inflects elsewhere as a member of class I (to which other intransitives belong). In paradigms of this sort, the absolute correlate of heteroclisis is tense. Certain other heteroclite verbs, however, cleave cleanly along the second-person/nonsecond-person boundary. For instance, the verb Ī-HEGWEHAGW 'work' (Table 20) inflects in the second person (singular and plural) as a member of class II, inflecting elsewhere as a member of class III. In paradigms of this sort, the absolute correlate of heteroclisis is person. In short, tense and person coexist as absolute correlates of heteroclisis in the paradigms of Takelma verbs.

| | | DŌᵘM 'kill' (with 3sg object agreement) | AL-WEʹKǃAL 'shine' | | HA-U-HANAᵋS 'stop' |
|---|---|---|---|---|---|
| CONJUGATION: | | CLASS III (tr) | | CLASS II (intr) | |
| Aorist | 1sg | tǃomomaʹᵋn | al-weʹkǃalaᵋn | | hanaʹᵋsdeᵋ |
| | 2sg | tǃomomaˋtˑ | al-weʹkǃalatˑ | | hanaʹᵋsdam |
| | 1pl | tǃomomanaˋkˑ | al-weʹkǃalanaˋkˑ | | hanaʹᵋsikˑ |
| Future | 1sg | dōᵘmaʹn | | al-weʹkǃaltˑeᵉ | haʹnᵋsdeᵉ |
| | 1pl | dōᵘmanagaʹm | | al-weʹkǃalpˑigam | haʹnᵋsigam |

TABLE 19. Heteroclite inflection of Takelma AL-WEʹKǃAL 'shine' (Sapir 1922:165f., 170f., 183).

In the database of heteroclite paradigms assembled for this study, no language exhibits more than two absolute correlates of heteroclisis in the paradigms of lexemes belonging to the same syntactic category (and two is itself rare).[40] While this limit may be a coincidental feature of the sampled languages, the following fact is nevertheless a clear one.

(37) The number of absolute correlates of heteroclisis in a given language is always much smaller than that language's full inventory of inflectional categories.

This fact is not, of course, a logical necessity.

**5.3.** A FRACTURED PARADIGM'S MAXIMAL CORRELATE. In fractured paradigms (those heteroclite paradigms lacking any absolute correlate), it is sometimes possible to distinguish a maximal correlate (in the sense defined in §5.1). Maximal correlates often participate in the following tendency.

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[39] The Takelma paradigms in Tables 19 and 20 are partial, listing only those forms specifically cited by Sapir; note that singular and plural subject agreement are not distinguished in third-person verb forms in Takelma (Sapir 1922:159).

[40] This, therefore, is where the analogy of heteroclite paradigms to crystalline minerals ends, since some minerals (e.g. sphalerite) have as many as six planes of cleavage.

| | | DŌ<sup>u</sup>M 'kill' (with 3sg object agreement) | | | Ī-HEGWEHAGW 'work' | HA-U-HANA<sup>ᵋ</sup>S 'stop' |
|---|---|---|---|---|---|---|
| CONJUGATION: | | CLASS III (tr) | | | CLASS II (intr) | |
| Aorist | 1sg | t!omoma'ᵋn | hegwe'hakʰʷnaᵋn | | | hana'ᵋsdeᵋ |
| | 2sg | t!omoma`t | | hegwe'hakʰʷdam | | hana'ᵋsdam |
| | 3sg | t!omõm | hegwe'hakʰʷ | | | hana'ᵋs |
| | 1pl | t!omomana'k' | hegwe'hakʰʷnana`k' | | | hana'ᵋsik' |
| | 2pl | t!omoma`t'p' | | hegwe'hakʰʷdap' | | hana'ᵋsdap' |
| Future | 1sg | dō<sup>u</sup>ma'n | he<sup>e</sup>gwa'kʰʷnan | | | ha'nᵋsdeᵉ |
| | 2sg | dō<sup>u</sup>mada'ᵋ | | he<sup>e</sup>gwa'kʰʷdaᵋ | | ha'nᵋsdaᵋ |
| | 3sg | dō<sup>u</sup>ma`nk' | [?] | | | ha'nᵋsdāᵃ |
| | 1pl | dō<sup>u</sup>managa'm | he<sup>e</sup>gwa'kʰʷnanagam | | | ha'nᵋsigam |
| | 2pl | dō<sup>u</sup>ma't'baᵋ | | he<sup>e</sup>gwa'kʰʷdabaᵋ | | ha'nᵋsdabaᵉ |
| Inferential | 1sg | dõmk'aᵋ | he<sup>e</sup>gwa'k'waᵋ(= -kʷ'-k'aᵋ) | | | ha'nᵋsgaᵋ |
| | 2sg | dõmk'ᵋeīt' | | he<sup>e</sup>gwa'k!weīt' | | ha'nᵋsk!eīt' |
| | 3sg | dõmk' | he<sup>e</sup>gwa`kʰʷ | | | ha'nᵋsk' |
| | 1pl | dõmk'anak' | he<sup>e</sup>gwa'k'wana`k' | | | ha'n[sgana`k' |
| | 2pl | dõmk'ᵋeīt'p' | | he<sup>e</sup>gwa'k!weīt'p' | | ha'nᵋsk!eīt'k' |

TABLE 20. Heteroclite inflection of Takelma ī-HEGWEHAGW 'work' (Sapir 1922:165f., 170f., 182).

(38) The inflectional categories appearing as maximal correlates in fractured paradigms tend to be the same as those appearing as absolute correlates in cloven paradigms belonging to the same syntactic category.

For instance, just as number is the absolute correlate of heteroclisis in the cloven paradigm of Czech PRAMEN, it is likewise the maximal correlate of heteroclisis in the fractured paradigms of PŘEDSEDA and SLUHA. Additional examples of tendency 38 are given in Table 21: in each instance, the inflectional category listed in the third column appears as an absolute correlate of heteroclisis in the cloven paradigm listed in the fourth column and as a maximal correlate of heteroclisis in the fractured paradigm listed in the fifth column; for each fractured paradigm, the maximal correlate's degree of correlation is given in parentheses.

| LANGUAGE | SYNTACTIC CATEGORY | INFLECTIONAL CATEGORY | CLOVEN PARADIGM | FRACTURED PARADIGM |
|---|---|---|---|---|
| Armenian | Verb | tense | GAL 'come' | AṘNEL 'take' (.92) |
| Sochiapan Chinantec | Verb | number | ʔɪ 'enter' | KIAU 'lie down' (.83) |
| | | | TAʔ 'fall down' | Dɪ̈ 'walk' (.83) |
| Ancient Greek | Noun | number | DESMOS 'chain' | GONU 'knee' (.87) |
| | | | PUR 'fire' | HÊPAR 'liver' (.87) |
| | | | PRESBEUTÊS 'ambassador' | TERAS 'portent' (.87) |
| Czech | Noun | number | DĚVČE 'girl' | KULI 'coolie' (.86 ~ 1.0) |
| | | | DÍTĚ 'child' | MUZEUM 'museum' (.79) |
| Polish | Noun | number | POETA 'poet' | SĘDZIA 'judge' (.79) |
| Sanskrit | Noun | case | YAKAN 'liver' | AHAN 'day' (.71) |
| | | | ASAN 'blood' | ASTHI 'bone' (.75) |

TABLE 21. Some correspondences between absolute correlates of heteroclisis in cloven paradigms and maximal correlates of heteroclisis in fractured paradigms.

**5.4.** A FRACTURED PARADIGM'S INTERSECTIVE CORRELATES. Although many heteroclite paradigms have maximal (and even absolute) correlates, many others do not. Consider, for example, the paradigm of the Czech noun FILOLOG 'philologist' (Table 8). Here,

the degree of number correlation is the same as the degree of case correlation: both are .93 (= 13/14); thus, even though the category of number is the maximal (and absolute) correlate of heteroclisis in the cloven paradigm of Czech PRAMEN, there is no maximal correlate of heteroclisis in the fractured paradigm of FILOLOG. Comparable examples abound, for example, in Fula (cloven REE(R) 'belly' vs. fractured HEN 'wind', Tables 18 and 7), Sanskrit (HṚD(AYA) 'heart' vs. VĀRI 'water'), Latin (URBS 'city' vs. DOMUS 'home'), Lithuanian (ŽMOGÙS 'man' vs. VÉJAS 'wind'), Polish (POETA 'poet' vs. BIEDNY 'pauper'), and so on.

Clearly, an inflectional category's status as the absolute correlate in a cloven paradigm does not guarantee that it will serve as a maximal correlate in fractured paradigms belonging to the same syntactic category. Even so, there does seem to be a weaker correspondence between cloven paradigms and fractured paradigms of the same syntactic category. This point can be most clearly elucidated with reference to another sort of correlation among inflectional categories and inflection classes in fractured paradigms. Where P is a fractured paradigm, the inflectional categories $A_1, \ldots, A_n$ are INTERSECTIVE CORRELATES of P's heteroclisis if and only if for each well-formed property set $\tau$ specified for exactly the categories $A_1, \ldots, A_n$ there is a single inflection class C such that every cell in P realizing $\tau$ inflects as a member of C. The inflectional categories $A_1, \ldots, A_n$ are MINIMAL INTERSECTIVE CORRELATES of P's heteroclisis if and only if there is no proper subset of $\{A_1, \ldots, A_n\}$ whose members are intersective correlates of P's heteroclisis.

Consider, for example, the fractured paradigm of Albanian BIE 'fall' (Table 22). The inflectional categories of tense and mood are intersective correlates of this paradigm's heteroclisis, since for any well-formed property set {TENSE:$\alpha$ MOOD:$\beta$ X}, there is a single conjugation class C such that each cell in BIE's paradigm that realizes {TENSE:$\alpha$ MOOD:$\beta$ X} inflects as a member of C: each cell realizing {present indicative X} inflects as a member of the second conjugation; each cell realizing {aorist indicative X} inflects as a member of the irregular conjugation to which THEM 'say' belongs; and so on. Since neither tense nor mood is itself an absolute correlate of this paradigm's heteroclisis, tense and mood are also minimal intersective correlates. The database of heteroclite paradigms assembled for this study suggests an important relation between cloven paradigms and fractured paradigms belonging to the same syntactic category.

> (39) Suppose S is a nonempty set of inflectional categories serving as absolute correlates in cloven paradigms of lexemes belonging to syntactic category C in language $\ell$. In that case, every fractured paradigm of category C in $\ell$ has a member of S as one of its minimal intersective correlates.

This claim is trivially true of fractured paradigms in which only two inflectional categories are distinguished; for instance, given that the fractured paradigm of Czech FILOLOG (Table 8) distinguishes only properties of number and case, the minimal intersective correlates of heteroclisis in this paradigm inevitably include number (= the absolute correlate of heteroclisis in the cloven paradigm of Czech PRAMEN). Nevertheless, fractured paradigms that distinguish three or more inflectional categories provide nontrivial evidence for the claim in 39; consider some examples.

Tense is the absolute correlate in the cloven paradigm of the Bulgarian verb SPI 'sleep', which follows the second conjugation in the present and the first conjugation elsewhere; correspondingly, tense is one of the minimal intersective correlates in the fractured paradigm of the verb JA(D) 'eat', which follows the third conjugation in the first-person singular present and elsewhere follows the first conjugation (Table 23).

|  |  | THEM 'say' | BIE 'fall' | HAP 'open' |
|---|---|---|---|---|
| CONJUGATION: |  | IRREGULAR |  | 2 |
| Present indicative | 1sg | them | bie | hap |
|  | 2sg | thua | bie | hap |
|  | 3sg | thotë | bie | hap |
|  | 1pl | themi | biem | hapim |
|  | 2pl | thoni | bini | hapni |
|  | 3pl | thonë | bien | hapin |
| Aorist indicative | 1sg | thashë | rashë | hapa |
|  | 2sg | the | re | hape |
|  | 3sg | tha | ra | hapi |
|  | 1pl | thamë | ramë | hapëm |
|  | 2pl | thatë | ratë | hapët |
|  | 3pl | thanë | ranë | hapën |
| Present subjunctive | 1sg | të them | të bie | të hap |
|  | 2sg | të thuash | të biesh | të hapësh |
|  | 3sg | të thotë | të bjerë | të hapëª |
|  | 1pl | të themi | të biem | të hapim |
|  | 2pl | të thoni | të bini | të hapni |
|  | 3pl | të thonë | të bien | të hapin |
| Present optative | 1sg | thënça | rënça | hapsha |
|  | 2sg | thënç | rënç | hapsh |
|  | 3sg | thëntë | rëntë | haptë |
|  | 1pl | thënçim | rënçim | hapshim |
|  | 2pl | thënçi | rënçi | hapshi |
|  | 3pl | thënçin | rënçin | hapshin |

TABLE 22. Heteroclite inflection of the verb BIE 'fall' in Standard Albanian (Barlow 2002:51f., 70, 88, 93, Newmark et al. 1982:44, 46ff., 55f.).

ª Cf. *të zërë* 'that s/he seizes' (conjugation 2).

Similarly, tense is the absolute correlate of heteroclisis in the paradigm of the Armenian verb GAL 'come' and one of the minimal intersective correlates of heteroclisis in the fractured paradigm of Armenian LAL 'cry' (Table 24).

In Hebrew, aspect is the absolute correlate in the cloven paradigm of the verb NGŠ 'approach', which follows the conjugation (or binyan) traditionally referred to as the Niphˑal in the perfect and that known as the Qal elsewhere; correspondingly, aspect is one of the minimal intersective correlates in the fractured paradigm of the Hebrew verb NḤH 'lead', which follows the Qal in the perfect and the imperative and elsewhere follows the Hiph'îl (Kautzsch 1910:220).

What one apparently does not find are languages in which cloven paradigms and fractured paradigms coexist in some syntactic category and in which some fractured paradigms in that category have minimal intersective correlates none of which appears as an absolute correlate in any cloven paradigm of that category. It should, however, be noted that a given syntactic category may, in some language, have fractured paradigms but no cloven ones; claim 39 has no implications for the fractured paradigms belonging to such a category. An apparent example of this sort is the category of nouns in Chukchi (Chukotko-Kamchatkan), where members of the heteroclite third declension follow the first declension in the singular and absolutive plural and may follow either the first or the second declension elsewhere in the plural (Spencer 1999). If this is the only pattern of nominal heteroclisis in Chukchi, then neither of a third-declension noun's minimal intersective correlates (i.e. neither number nor case) is an absolute correlate of heteroclisis in this language.

| | | KRAD 'steal' | JA(D) 'eat' | DÁVA 'give' | GAS 'extinguish' | SPI 'sleep' | KŰP 'bathe' |
|---|---|---|---|---|---|---|---|
| CONJUGATION: | | 1ST | | 3RD | 2ND | | 1ST |
| Present | 1sg | kradó | jám | dávam | gasjá | spjá | kűpja |
| | 2sg | kradéš | jadéš | dávaš | gasíš | spíš | kűpeš |
| | 3sg | kradé | jadé | dáva | gasí | spí | kűpe |
| | 1pl | kradém | jadém | dávame | gasím | spím | kűpem |
| | 2pl | kradéte | jadéte | dávate | gasíte | spíte | kűpete |
| | 3pl | kradót | jadót | dávat | gasját | spját | kűpjat |
| Imperfect | 1sg | kradjáx | jadjáx | dávax | gasjáx | spjáx | kűpex |
| | 2sg | kradéše | jadéše | dávaše | gaséše | spéše | kűpeše |
| | 3sg | kradéše | jadéše | dávaše | gaséše | spéše | kűpeše |
| | 1pl | kradjáxme | jadjáxme | dávaxme | gasjáxme | spjáxme | kűpexme |
| | 2pl | kradjáxte | jadjáxte | dávaxte | gasjáxte | spjáxte | kűpexte |
| | 3pl | kradjáxa | jadjáxa | dávaxa | gasjáxa | spjáxa | kűpexa |
| Aorist | 1sg | krádox | jádox | dávax | gasíx | spáx | kűpax |
| | 2sg | kráde | jáde | dáva | gasí | spá | kűpa |
| | 3sg | kráde | jáde | dáva | gasí | spá | kűpa |
| | 1pl | krádoxme | jádoxme | dávaxme | gasíxme | spáxme | kűpaxme |
| | 2pl | krádoxte | jádoxte | dávaxte | gasíxte | spáxte | kűpaxte |
| | 3pl | krádoxa | jádoxa | dávaxa | gasíxa | spáxa | kűpaxa |

TABLE 23. Heteroclite inflection of the verbs JA(D) 'eat' and SPI 'sleep' in Bulgarian (Scatton 1984:211f., 217, 223, 226f., 238, 240).

| | | TESNEL 'see' | GAL 'come' | KARDAL 'read' | LAL 'cry' | XŌSIL 'speak' |
|---|---|---|---|---|---|---|
| CONJUGATION: | | 1ST CONJUGATION of secondary verbs | | 3RD CONJUGATION of primary verbs | | 2ND CONJUGATION of primary verbs |
| Present | 1sg | kə tesnem | kū gam | kə kardam | kū lam | kə xōsim |
| | 2sg | kə tesnes | kū gas | kə kardas | kū las | kə xōsis |
| | 3sg | kə tesnē | kū gay | kə karday | kū lay | kə xōsi |
| | 1pl | kə tesnenk' | kū gank' | kə kardank' | kū lank' | kə xōsink' |
| | 2pl | kə tesnēk' | kū gak' | kə kardak' | kū lak' | kə xōsik' |
| | 3pl | kə tesnen | kū gan | kə kardan | kū lan | kə xōsin |
| Imperfect | 1sg | kə tesnēi | kū gayi | kə kardayi | kū layi | kə xōsēi |
| | 2sg | kə tesnēir | kū gayir | kə kardayir | kū layir | kə xōsēir |
| | 3sg | kə tesnēr | kū gar | kə kardar | kū lar | kə xōsēr |
| | 1pl | kə tesnēink' | kū gayink' | kə kardayink' | kū layink' | kə xōsēink' |
| | 2pl | kə tesnēik' | kū gayik' | kə kardayik' | kū layik' | kə xōsēik' |
| | 3pl | kə tesnēin | kū gayin | kə kardayin | kū layin | kə xōsēin |
| Aorist | 1sg | tesay yekay | | kardaċi | laċi | xōseċay |
| | 2sg | tesar yekar | | kardaċir | laċir | xōseċar |
| | 3sg | tesav yekav | | kardaċ | laċav | xōseċav |
| | 1pl | tesank' yekank' | | kardaċink' | laċink' | xōseċank' |
| | 2pl | tesak' yekak' | | kardaċik' | laċik' | xōseċak' |
| | 3pl | tesan yekan | | kardaċin | laċin | xōseċan |

TABLE 24. Heteroclite inflection of the Armenian verbs GAL 'come' and LAL 'cry' (indicative forms) (Kogian 1949:82, 84ff., 96ff., 118, 121).

**5.5.** A FORMAL INTERPRETATION OF OBSERVATIONS 36–39. It is apparent from the observations in §§5.2–4 that there is an asymmetry among a language's inflectional categories. In particular, 36–39 suggest that the inflectional categories serving as absolute correlates of heteroclisis in a given language are PRIVILEGED, and that the inflection-class boundaries in that language's heteroclite paradigms are in some way sensitive to the privileged status of these categories. It is clear that whether a given inflectional category is privileged varies from language to language; that is, there does not seem

to be any inflectional category that is universally privileged. Moreover, most languages seem to require that among the inflectional categories relevant for the inflection of a particular syntactic category, there be at most one that is privileged (= 36); in Czech, for example, number is the only privileged inflectional category among the categories relevant for nominal inflection. (In Takelma, however, tense and person are both privileged among the categories relevant for verb inflection.) In any event, the majority of a language's inflectional categories are unprivileged (= 37); indeed, the inflectional categories for which the member lexemes of a particular syntactic category inflect may or may not include any that are privileged. (If the member lexemes of a syntactic category C do inflect for a privileged inflectional category, I henceforth say that C too is privileged.) If a heteroclite lexeme belongs to a privileged syntactic category, then a privileged inflectional category participates in conditioning the juxtaposition of inflection classes in its paradigm (= 38, 39).

In the paradigm-linkage approach, the notion of a paradigm's sensitivity to an inflectional category's privileged status can be given formal substance by means of the following well-formedness condition on a language's rules of paradigm linkage.

> (40) PRIVILEGED CATEGORY RESTRICTION (PCR): If a rule of paradigm linkage applies to lexemes belonging to a privileged syntactic category C and this rule is sensitive to the value of any inflectional category, then it is sensitive to the value of a privileged inflectional category for members of C.

Consider the implications of the PCR for rules of paradigm linkage of various types.

The PCR has no implications for the default rule of paradigm linkage in 5, since its application is insensitive to the value of any inflectional category. The same is true of language-specific rules of paradigm linkage such as those in 12 and 13.

As we have seen, some rules of paradigm linkage are sensitive to the value of a single inflectional category; examples are the Czech rule of paradigm linkage in 14 (which is sensitive to number), the Old English rule in 21a (sensitive to tense), the Sanskrit rules in 26 and 29 (sensitive to case and tense, respectively), and the Greek rules in 35 (sensitive to gender). All such rules engender cloven paradigms in which the conditioning inflectional category is an absolute correlate of heteroclisis (that is, a privileged category); rules of this sort therefore necessarily conform to the PCR.

If a rule of paradigm linkage applies to lexemes belonging to a privileged syntactic category C and that rule is sensitive to the value of one or more unprivileged inflectional categories, then the PCR entails that it is also sensitive to the value of a privileged inflectional category for members of C. Consider an instance of the satisfaction of this requirement. In Czech, the heteroclite inflection of PŘEDSEDA, SLUHA, and FILOLOG depends on the rules of paradigm linkage in 14, 15, and 17; all three rules apply to a content-cell $\langle L, \sigma \rangle$ to assign a coradical form-correspondent. The application of rule 14 requires that $\sigma$ = {plural X}; as we have seen, this identifies number as a privileged inflectional category (and nouns as a privileged syntactic category) in Czech. The application of rule 15 requires that $\sigma$ = {dative singular X} or {locative singular X}, and that of rule 17 requires that $\sigma$ = {locative plural X}: although these rules are sensitive to the value of an unprivileged inflectional category (i.e. of case), they are also sensitive to the value of the privileged inflectional category for nouns (i.e. of number) and therefore satisfy the PCR.

The database of heteroclite paradigms assembled for this study exhibits uniform compliance with the PCR. Some of the relevant evidence is presented in Table 25. For each language in this table (column 1), I list heteroclite lexemes (column 4) belonging

to the same syntactic category (column 2); for each language, at least one of the listed lexemes has a cloven paradigm (column 3). For each lexeme I list the inflection-class membership of both its root and its coradical (column 5). Column 6 specifies the morphosyntactic property set that causes the lexeme to be assigned a coradical form-correspondent. The privileged inflectional category relevant for the heteroclites cited from each language is underlined in column 6. In every one of these languages, an inflectional category serving as an absolute correlate of heteroclisis in cloven paradigms also invariably conditions the assignment of a coradical form-correspondent in fractured paradigms. That this should always be so is the essential content of the PCR.

| LANGUAGE | PRIVILEGED SYNTACTIC CATEGORY | PARADIGM CLOVEN OR FRACTURED? | HETEROCLITE LEXEME | INFLECTION CLASS OF ROOT/CORADICAL | PROPERTY SETS WHOSE REALIZATION CONDITIONS USE OF CORADICAL (privileged inflectional category underlined) |
|---|---|---|---|---|---|
| Ancient Greek | Noun | cloven | DESMOS 'chain' | *o*-stem/neuter *o*-stem | {<u>NUMBER</u>:plural X} |
| | | fractured | HĒPAR 'liver' | *t*-stem/*r*-stem | {CASE:α, <u>NUMBER</u>:singular X}, where α is direct |
| | | fractured | GONU 'knee' | *t*-stem/*u*-stem | |
| | | fractured | TERAS 'portent' | *t*-stem/*s*-stem | |
| Armenian | Verb | cloven | GAL 'come' (Table 24) | 3rd conj. of 1ary verbs/ 1st conj. of 2ary verbs | {<u>TENSE</u>:aorist, X} |
| | | fractured | LAL 'cry' (Table 24) | 3rd conj. of 1ary verbs/ 2nd conj. of 1ary verbs | {<u>TENSE</u>:aorist, AGR:{3rd singular} X} |
| Bulgarian | Verb | cloven | SPI 'sleep' (Table 23) | 2nd conj./1st conj. | {<u>TENSE</u>:present X} |
| | | fractured | JA(D) 'eat' (Table 23) | 1st conj./3rd conj. | {<u>TENSE</u>:present, AGR:{1st singular} X} |
| Fula | Noun | cloven | REE(R) 'belly' (Table 18) | Grade A stem/Grade C stem | {<u>EVAL</u>:neutral, X} |
| | | fractured | HEN 'wind' (Table 7) | Grade A stem/Grade D stem | {<u>EVAL</u>:neutral, NUM:singular} |
| | | fractured | HUU 'thing' | Grade D stem/Grade B stem | {<u>EVAL</u>:neutral, NUM:plural} |
| Lithuanian | Noun | cloven | ŽMOGÙS 'man' | *(i)u* decl./*ė* decl. | {<u>NUM</u>:plural, X} |
| | | fractured | VÉJAS 'wind' | *(i)a* decl./*(i)u* decl. | {CASE:α, <u>NUM</u>:singular, X}, where α is vocative (optionally locative) |
| Sanskrit | Nominal | cloven | YAKAN 'liver' (Table 14) | *an*-stem/general C-stem | {<u>CASE</u>:α, X}, where α is direct; cf. 26 certain instances of {<u>CASE</u>:β, NUM:γ, GEND:neuter}; cf. 20 |
| | | fractured | AHAN 'day' (Table 10) | *an*-stem/*s*-stem | |
| | | fractured | VĀRI 'water' | *i*-stem/*in*-stem | certain instances of {<u>CASE</u>:β, NUM:γ, GEND:neuter} |
| Sochiapan Chinantec | Verb | cloven | ʔI 'enter' | A.32.31.6.x/A.64.31.x.3 | {<u>NUM</u>:plural, X} |
| | | cloven | TAʔ 'fall down' | C.59/C.70 | |
| | | fractured | ŋI 'walk' (Table 13) | A.59.1.3.1/α.B.1.1 | {<u>NUM</u>:plural, PER:α, X}, where α = 2nd or 3rd, cf. 23 |
| | | fractured | KIAU 'lie down' | A.56.12.7.1/A.26.23.x.x | |

TABLE 25. Conformity of some heteroclite lexemes to the privileged category restriction (Jannaris 1968, Kogian 1949, Scatton 1984, Arnott 1970, Ambrazas 1997, Whitney 1889, Foris 2000).

The PCR is not, of course, a logical necessity. One could imagine a language having just the two rules of paradigm linkage in 41. By 41a, number would be an absolute correlate of heteroclisis in the cloven paradigms of type-I verbal lexemes, but by 41b, tense and person (but not number) would be minimal intersective correlates of heteroclisis in the fractured paradigms of type-II verbal lexemes; Table 26 illustrates. Though this sort of system is logically conceivable, the PCR entails that it should not actually exist: even though number would be a privileged inflectional category for verb inflection, the application of the rule assigning coradical form-correspondents to a type-II verbal lexeme would be insensitive to number.

(41) Rules of paradigm linkage in a hypothetical language:
a. If L is a type-I verbal lexeme having s as its class B coradical and σ = {plural X}, then ⟨L, σ⟩ has ⟨s, σ⟩ as its form-correspondent.
b. If L is a type-II verbal lexeme having s as its class B coradical and σ = {past 3rd X}, then ⟨L, σ⟩ has ⟨s, σ⟩ as its form-correspondent.

The PCR has a clear functional motivation for the language learner. Whenever a lexeme belonging to syntactic category C is found to have a cloven paradigm, the

|  |  | TYPE-I LEXEME | | TYPE-II LEXEME | |
|---|---|---|---|---|---|
|  |  | PRESENT | PAST | PRESENT | PAST |
| Singular | 1st |  |  |  |  |
|  | 2nd |  |  |  |  |
|  | 3rd |  |  |  |  |
| Plural | 1st |  |  |  |  |
|  | 2nd |  |  |  |  |
|  | 3rd |  |  |  |  |

☐ = inflection class A    ■ = inflection class B

TABLE 26. Hypothetical cooccurrence of cloven and fractured paradigms prohibited by the PCR.

absolute correlate A of its heteroclisis is, by definition, a privileged inflectional category for members of C; by the PCR, any rule of paradigm linkage assigning coradical form-correspondents to a member of C must be sensitive to category A. In this way, the PCR substantially narrows the set of rules by which coradical form-correspondents might potentially be assigned: a candidate rule is immediately excluded if it is not conditioned by an inflectional category that is privileged.

The PCR is not, of course, the only manifestation of asymmetry among a language's inflectional categories; accordingly, the PCR might ultimately be derivable as a theorem of some more general pattern of hierarchization among inflectional categories in natural language; this possibility must await further research.

**5.6.** SIMPLE STEM ALTERNATION AND PRIVILEGED INFLECTIONAL CATEGORIES. Heteroclisis is one sort of stem alternation, but not all paradigms exhibiting stem alternation are heteroclite (§2). Even so, the PCR should perhaps be seen as pertaining both to heteroclisis and to nonheteroclitic stem alternations. As it is, the PCR makes a substantive prediction about the incidence of simple ( = nonheteroclitic) stem alternation in inflectional paradigms. In instances of simple stem alternation, a lexeme's paradigm is built on a root and one or more coradicals differing from the root in form but not in inflection-class membership; examples are the paradigm of the Sanskrit adjective PRATYAÑC 'westerly' (in which the coradicals *pratyac* and *pratīc* belong to the same declension as the root *pratyañc*; Table 9) and that of Russian MAT' 'mother' (in which the stems *mat'* and *mater'* belong to the same declension; Table 5). The PCR entails that in instances of simple stem alternation, as in instances of heteroclisis, if a rule of paradigm linkage applies to a lexeme belonging to a privileged syntactic category and that rule is sensitive to the value of some inflectional category, then it is sensitive to the value of a privileged inflectional category. This entailment appears to be empirically confirmed. For instance, in the inflection of Sanskrit PRATYAÑC, the rules 20a,b assigning form-correspondents containing the Middle and Weakest coradicals *pratyac* and *pratīc* are sensitive to case, a privileged inflectional category for Sanskrit nouns; in the inflection of Russian MAT', the rule assigning form-correspondents containing the coradical *mater'* must be sensitive to number, a privileged category for Russian nouns;[41] and so on.

Other apparent similarities between heteroclisis and simple stem alternation suggest that the PCR should be interpreted more broadly. In §5.5, a PRIVILEGED inflectional category is defined as one serving as an absolute correlate of heteroclisis. If the notion

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[41] Witness, for example, the fact that KOTËNOK 'kitten' follows declension I in the singular and declension IV in the plural. (I here assume the declension-class labels of Corbett & Fraser 1993.)

of privilege is defined in this way, then no instance of simple stem alternation suffices to establish an inflectional category as a privileged one. Consider, however, the alternative of defining a privileged category more broadly, as one serving as an absolute correlate of either heteroclisis or simple stem alternation (where an inflectional category C is an absolute correlate of simple stem alternation in some paradigm P if and only if for each value v of C, there is a single stem s such that every realization of v in P is based on s). Under this revised definition, an instance of simple stem alternation may suffice to establish an inflectional category as privileged.

If the definition of privilege is broadened in this way, then the PCR makes richer predictions. Consider, for instance, the incidence of simple stem alternation in the inflectional paradigm of the Breton preposition A 'of' (Table 27): the stem *anez* appears in the third person, and the stem *ac'han* elsewhere. Because person is an absolute correlate of simple stem alternation in this paradigm, this pattern of stem alternation establishes person as a privileged inflectional category (and preposition as a privileged syntactic category) in Breton. By the PCR, this entails that every rule of paradigm linkage assigning a coradical form-correspondent to a prepositional lexeme must be sensitive to person; the observable patterns of stem alternation in the inflection of Breton prepositions satisfy this prediction, as the patterns in Table 28 show. This is not a prediction made under the earlier, narrow definition of privilege, since the inflection of Breton prepositions presents no instances of outright heteroclisis (even though the inflecting prepositions do follow more than one 'conjugation'; Trépos 1968:149).

|  |  | HERVEZ 'according to' | A 'of' |
|---|---|---|---|
| Singular | 1st | hervezon | ac'hanon |
|  | 2nd | hervezout | ac'hanout |
|  | 3rd masculine | hervezañ | anezañ |
|  | feminine | hervezi | anezi |
| Plural | 1st | hervezom | ac'hanom |
|  | 2nd | hervezoc'h | ac'hanoc'h |
|  | 3rd | hervezo | anezo |

TABLE 27. Simple suppletion in the inflection of Breton A 'of'.

| PREPOSITION | NONTHIRD-PERSON STEM | THIRD-PERSON STEM |
|---|---|---|
| DA 'to' | di (sg), di ~ de (1pl), de (2pl) | dez |
| EVEL 'as' | eveld | evelt |
| EVID 'for' | evid | evit |
| GAND 'with' | gan (sg), gane (pl) | gant |
| HEB 'without' | hebd | hept |
| NEMED 'except' | nemed | nemet |
| OUZ 'against' | ouz | out |

TABLE 28. Stem suppletion in Breton prepositional paradigms.

Further comparison of heteroclisis and simple stem alternation will be necessary to confirm the desirability of broadening the interpretation of the PCR in this way.[42]

**6.** SUMMARY AND CONCLUSIONS. In light of the phenomena examined in this article, it is clear that the lexical approach to heteroclisis in 1 is untenable for two reasons.

First, it is clear that instances of heteroclisis sometimes involve very systematic associations between inflection classes and sets of morphosyntactic properties. In a

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[42] For relevant discussion of the general phenomenon of suppletion, see Corbett 2006, Hippisley et al. 2004, Maiden 2004, Markey 1985, and Mel'čuk 1994.

theory in which heteroclisis were attributed purely to piecemeal stipulations in specific lexical entries, real generalizations about these associations would not be expressible: these include generalizations about stem inference and inflection-class juxtaposition in principal-parts systems (e.g. 29a,b), in systems associating particular inflection classes with particular syntactic contexts (e.g. 30, 31), in systems in which a defective inflection class is dependent on a nondefective one (e.g. 32, 33), and in systems in which inflection classes are recruited for the expression of specific morphosyntactic distinctions (e.g. 34, 35).

Second, heteroclisis universally obeys the constraint embodied by the privileged category restriction (40), a well-formedness condition on rules of paradigm linkage. In a theory in which heteroclisis were attributed purely to piecemeal stipulations in the entries of individual lexical items, conformity to this constraint would remain unaccounted for.

The theory of paradigm linkage developed in §3 satisfactorily accounts for the various kinds of phenomena that exclude hypothesis 1. It allows generalizations about systematic instances of heteroclisis to be directly expressed by means of rules of stem inference and paradigm linkage, and it allows a universal constraint on heteroclite realization of morphosyntactic property sets to be represented as a constraint on rules of the latter sort.

The facts presented here have decisive implications regarding the status of inflectional paradigms in morphological theory. In recent years, a number of theoretical frameworks have been proposed that portray paradigms as merely epiphenomenal—as having no essential role in the definition of a language's inflectional morphology; these are generally frameworks in which inflectional markings are assumed to have the theoretical status of lexical entries. The facts presented here cast serious doubt on the viability of such frameworks, extending and strengthening the already substantial body of evidence that paradigms are indispensable to the definition of inflectional systems (Stump 2001, 2005b).

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