

The paradigmatic dimension of stem allomorphy in Italian verb inflection

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This paper is concerned with a detailed analysis of stem allomorphy in Italian Conjugation, carried out from a phonological and paradigmatic perspective. In theory, one would expect these two complementary viewpoints to take care of neatly separable classes of phenomena. In fact, the two dimensions turn out to be interlocked in a complex way, to define a *grammatical continuum* ranging from minor phonological processes to full suppletion. A formal descriptive framework is proposed here, whereby several insights into the structure of inflectional paradigms (Matthews 1974, Carstairs 1987, Wurzel 1989, Stump 1991, Aronoff 1994) are dealt with from a unifying, purely morphological perspective. In this framework, the structure of a verb paradigm is characterised in terms of a *distribution of slots* into a number of equivalence classes, or *set partition*, where each equivalence class is associated with a *morphologically distinct stem root*. It is shown that, in Italian, a few set partitions account for the structure of *all* Italian verb paradigms, whether regular or less regular. Moreover, all these partitions are mutually related *homomorphically*. This well-behaved family of distributions tightly constrains stem allomorphy at an appropriate level of abstraction, independently of whether the origin of allomorphy is morpho-phonological or purely morphological, showing the superiority of the obtained generalisations over more traditional syntagmatic accounts.*

1. The problem

Following a by now classic analysis of Matthews (1972, 1974 and 1991), an *inflectional paradigm* is the set of all *grammatical words* of a given dictionary word or *lexeme L*. A grammatical word is an instance of *L* in a particular syntactic context, i.e. provided with a set of contextually appropriate morphosyntactic features such as PERSON, NUMBER, TENSE etc., and their morpho-phonological realisation as bound formatives. For example, *tried* in the context *the player tried hard to win* is the form of the grammatical word PAST TENSE of TRY.¹ This is different from the homonymous grammatical word in *that solution was never tried*, where we have an occurrence of PAST PARTICIPLE of TRY. The grammatical words of *L* are said to be *members* of its paradigm.

A paradigm is structured in such a way that, for each form *F* of *L*, there exists at least one legitimate combination of morphological

features such as PERSON, NUMBER, TENSE, MOOD etc., which *F* is said to realise. Each such a well-formed array of features will hereafter be referred to as *slot* of a paradigm. Let us consider a simple portion of the paradigm of the Italian verb AMARE 'love', namely PRESENT INDICATIVE ACTIVE, where forms are given in broad phonetic transcription (Table 1).²

Table 1

AMARE: PRESENT INDICATIVE ACTIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'amo	'ami	'ama	a'mjamo	a'mate	'amano

Paradigmatic slots are uniquely identified through embedded levels of morphosyntactic features. Given *L*, we will refer to the set of all grammatical words for a given combination of tense-mood-voice properties as a *partial paradigm* of *L*. Table 1 above hence shows the PRESENT INDICATIVE ACTIVE partial paradigm of AMARE.

If the forms in Table 1 differed from one another in unpredictable ways, there would be no alternative to listing them all in the lexicon. In fact, paradigms normally exhibit a high degree of *systematic formal redundancy*, both *intra-* and *inter-paradigmatic*. More concretely, the PRESENT INDICATIVE of AMARE shows the leftmost invariant segmental subsequence [am(a)] shared by all forms of Table 1. This is classically analysed as consisting of the *lexical root* ['am-], followed by an optionally realised *thematic vowel* [-a-] common to the entire verb class, or *conjugation class*, to which AMARE belongs (so-called *first Conjugation* or *C1*).³ The sequence LEXICAL ROOT + THEMATIC VOWEL is traditionally called the (inflectional) *stem* of PRESENT INDICATIVE. While the lexical root of *L* is unique and normally invariant, more stems are typically associated with the same lexical root. The relation between formally varying stems of the same *L*, or *stem alternation*, a common fact in the inflection of a great many languages, is due to a variety of factors, as summarised in what follows.

Stem alternation can be purely morphological, meaning that it correlates with a specific array of morphosyntactic features, independently of variation in the embedding phonological context. For example, given the two Italian forms *amo* '(I) love' and *amato* 'loved' (PAST PARTICIPLE, MASCULINE SINGULAR), the formal relation between the substrings *am-* and *amat-* has nothing to do, here, with the presence of an ensuing *-o*. Now compare this case with the PRESENT INDICATIVE

pair *rischio/rischi*, '(I) risk, (you) risk', where the difference between *rischio* in *rischio+o* and *risch* in *risch+i* is due to an *i* (phonologically a glide) being dropped before an inflectional ending beginning with another *i* (see section 2.2 for details of this analysis). In this case, the formal relation between the two alternants is thus purely phonological. Other cases, however, are more difficult to judge, as they involve *simultaneous* change of both morphological features and embedding phonological environment, as exemplified by the PRESENT INDICATIVE paradigm of the Italian verb VENIRE 'come' in Table 2 below.

Table 2

VENIRE: PRESENT INDICATIVE ACTIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'vengo	'vjeni	'vjene	ve'njamo	ve'nite	'vengono

While there is wide agreement on considering ['veng, 'vjɛn, ven] as integral parts of verb stems, there is far less agreement on how they should mutually be related in a grammar: are they context-free realisations of different arrays of morphosyntactic properties, or rather the outcome of a phonological change affecting a unique underlying base form in a phonologically-defined context? The two solutions amount, respectively, to a *paradigmatic* and a *syntagmatic account* of stem alternation, the former emphasising the role of morphological meaning in stem change, while the other focusing on the way morphological forms are altered as the result of their being accompanied, in context, by specific phonological segments (Zwicky 1994, Stump 1995). Inflectional languages exhibit a considerable amount of data such as those in Table 2, where the paradigmatic and syntagmatic perspectives turn out to be almost inextricably intertwined. In going through the relevant literature, the theoretically-uncommitted reader would hardly find any objective evaluation of the merits of either approach in these controversial cases. In fact, the ongoing debate is often obscured, rather than clarified, by theory-laden considerations concerning the expressive power of admissible phonological rules (e.g., "is augmentation, or augment deletion, a truly phonological process in its own right?"), or the (lack of) explanatory adequacy of paradigmatic accounts of stem alternation. Moreover, it is at times the case that general conclusions are drawn on the basis of a few examples only, with comparatively less effort being put into an overall account of the entire body of data in the conjugation system of a language.

Our attempt, throughout this paper, is to tackle these issues in a bottom-up fashion, starting from a comprehensive overview of the relevant Italian data, to end up evaluating how nicely they fit in with either account, with comparatively little (if any) questioning of the methodological underpinnings of each one. For this purpose, we have focused on the issue of descriptive adequacy first, to eventually assess, in the light of the data, what generalisations each account can afford, and how helpful these generalisations are in unveiling non trivial properties of the conjugation system of Italian as a whole. To anticipate some of the conclusions of our work, a truly paradigmatic account of our data appears to be superior to comparable syntagmatic accounts. The upshot is that paradigmatic constraints on stem alternation represent an independent set of structural properties of the morphology of Italian, whose function is to regiment the way both morphological and morpho-phonological alternants distribute over paradigmatic slots. In our view of things, this does not necessarily mean that all such phenomena should be treated paradigmatically, as syntagmatic accounts offer, in some cases, the further bonus of predicting the distribution of stem alternants with no extra *ad hoc* stipulation. Still, syntagmatic accounts do not make paradigmatic constraints dispensable in the least, as the latter can block applications of the former when a conflict arises, while paradigmatic constraints being infringed only by low-level automatic phonological processes. As a result, the much-debated dividing line between morpho-phonology and phonology proper can persuasively be argued to be sensitive to the paradigmatic, rather than syntagmatic (or contextual) axis of linguistic description: ⁴ unlike purely phonological processes, morpho-phonological processes are subject to *paradigm congruity*, a specific aspect of Wurzel's *system adequacy* (1989).

In what follows, we will first look into some preliminary terminological matters (section 2), to then move on to an illustration of the variety of stem distribution and stem shape types attested in Italian conjugation. This will be done by resorting to a powerful descriptive device called *distribution schema* (section 3). We finally assess how well different accounts fit in with the data in question (section 4), sketch out possible ways of exploiting different descriptive insights (section 4.2.5) and make some concluding remarks (section 5).

2. Preliminaries

A fundamental property of a paradigm-based style of morphological representation is that it neatly separates an (inflected) form from

its morphological content, that is from the array of lexical and morphosyntactic features that the form realises. In Table 1, nothing is stated explicitly as to what sound stretch in – say – [amo] bears the feature SINGULAR, or what other stretch is, as it were, the signpost of lexical information. This by no way means that paradigms have nothing to say about the way word forms come about in appropriate slots the way they do, but only that this realisation process is not conceived of as an isomorphic correspondences of phonological segments embedding and linear subsequences of phonological segments (Anderson 1992, Beard 1987, 1995), or, to put it more classically, as the concatenation of simple “sames” of meaning and form, according to the Bloomfieldian definition of morpheme (Bloomfield 1935). In a paradigm-based approach, the mediation between lexical plus grammatical categories on the one hand and phonological substance on the other hand is taken care through the interaction of morphological functions which, following Zwicky (1990), will comprehensively be referred to as *realisation rules*. They ultimately define the spell-out of a grammatical word for each slot in a paradigm.

Our informal definition of paradigm presupposes the following principle of *paradigmatic integrity*:

PARADIGMATIC INTEGRITY (PI)

Each slot in a paradigm is taken by one word form

In the spirit of *PI*, a paradigm where a given slot is not associated with an attested word form is irregular and called “defective”. *PI* can be stated more restrictively, to the effect that each paradigmatic slot is expected to take *one and only one* word form. In fact in inflectional morphology this is more a trend than a watertight regularity: some verbs exhibit so called *doublets*, i.e. different forms associated with the same slot in the paradigm (e.g., Italian *perduto/perso* ‘lost’ are both PAST PARTICIPLE forms of PERDERE). ⁵ Be that as it may, both types of exception (empty slots and slots filled in twice by doublets) do not detract from *PI* being a deeply entrenched principle of paradigmatic structure, whose grammatical status is admittedly still far from being fully understood. Later in the paper (section 4.2), we will return to exceptions to *PI*, to show that doublets shed in fact considerable light on principles underlying the overall organisation of paradigms. Finally, it is useful to remind here that the reverse of *PI* leads to a false statement: in fact, it is not generally true that each word form in a paradigm is associated with one and only one slot, as

proved by the extensive syncretism in the PRESENT SUBJUNCTIVE paradigm of AMARE, in Table 3 below.

Table 3

AMARE: PRESENT SUBJUNCTIVE			
SINGULAR		PLURAL	
1	2	3	1
'ami	'ami	'ami	a'mjamo
			a'mjate
			'amino

2.1. Stems and stem roots

Italian inflected forms can basically be described through the canonical structure STEM + ENDING, exemplified by the forms in Table 4 where the thematic vowel is highlighted in bold small capitals. Endings carry information about number and person of a form, regularly realised cumulatively, the stem conveying tense and mood of the lexical entry expressed by the lexical root.

Table 4

FORM	PARADIGM SLOT	ENGLISH GLOSS
<i>ama+te</i>	PRES IND 2P	'(you) love'
<i>ama+i</i>	PASS REMOTO 1S	'(I) loved'
<i>amaVA+nò</i>	IMP IND 3P	'(they) were loving'
<i>amaI(O)+i</i>	PAST PART MP	'loved'

In the first row of Table 4, the string that precedes the thematic vowel corresponds to the *lexical root* of the verb in question (*am-*). Note that the PRESENT INDICATIVE stem of AMARE (*ama-*) is identical to the one in the PASSATO REMOTO (second row in Table 4) while the IMPERFECT INDICATIVE and PAST PARTICIPLE stems are built upon *ama-* through addition of *-va* and *-to* respectively (third and fourth row). In the last two cases the string immediately preceding the rightmost thematic vowel (namely *amaV-* and *amaI-*) no longer corresponds to a lexical root. For convenience, we will hereafter refer to such morphologically complex strings as *stem roots*. In all Italian regular verbs, the lexical root is formally identical to the PRESENT INDICATIVE stem root. As we will see in more detail in the remainder of this paper, stem roots show predictable patterns of paradigmatic distribution, independently of the behaviour of an accompanying thematic vowel.

As to thematic vowels themselves, their surface realisation is predictably determined on the basis of i) the verb being a member of a particular conjugation class, ii) the paradigm slot where they occur, iii) their embedding phonological context. For example, the theme vowel *-e-* (both stressed and unstressed) is regularly replaced by *u* in the PAST PARTICIPLE stem of regular verbs, as exemplified by the forms *temUto* 'feared', *caduUto* 'fallen', *perduUto* 'lost' etc.

The regular behaviour in the distribution of both theme vowels and inflectional endings of Italian conjugation is in sharp contrast with the extensive variability shown by processes of stem formation, with respect to the regular patterns of Table 4. The first row of Table 5 below illustrates this through the PAST PARTICIPLE of ASSUMERE 'take up, assume'.

Table 5

PAST PARTICIPLE			
SINGULAR		PLURAL	
MASCULINE	FEMININE	MASCULINE	FEMININE
as'sunto	as'sunta	as'sunti	as'sunte
'visto	'vista	'visti	'viste

Here, the PAST PARTICIPLE stem root [as'sunt] replaces the expected *[assu'mut], and [m] in the verb root [assum] is eventually turned into [n] by regressive assimilation. The second example of Table 5 shows a still less transparent instance of PAST PARTICIPLE stem formation (stem root [vist]) of the verb *VEDERE* 'see', whose PRESENT INDICATIVE stem (['vede]) and root ([ved]) barely share the onset of their PAST PARTICIPLE counterpart. Note that, in both cases, stem variability does not affect terminations, which are formally identical to those found in the regular PAST PARTICIPLE. Aronoff (1994) ascribes the formal variability in Table 5 to the operation of *variable functions* of stem formation. It is to a detailed consideration of stem formation as a variable function that we turn now.

2.1.1. Aronoff's basic stems

It is a well-known linguistic fact that different stems of the same verb are often related formally in a systematic fashion. In Latin conjugation, for example, there exists a non fortuitous correspondence between the PAST PARTICIPLE stem and SUPINE and FUTURE PARTICIPLE stems. The FUTURE ACTIVE PARTICIPLE stem *amatūr-ō-* seems to derive

from the PAST PASSIVE PARTICIPLE *amatô-* through addition of *-ûrô-*.⁶ The relationship is merely formal, in that it appears not to be accompanied by any correspondence in meaning: there is no acceptable sense in which the meaning of the FUTURE ACTIVE PARTICIPLE includes that of the PAST PASSIVE PARTICIPLE. Moreover, the relationship proves to be independent of how regular the process of stem formation in question is. Even with instances of variable stem functions, as in the case of the irregular PAST PARTICIPLE *visus* 'seen', the formal correspondence with *visurus* still holds perfectly. An identical point can be made for SUPINE stems, such as *amatû-* or *visû-*, and their meaning.

The ancient grammatical tradition used to treat these cases through the statement of a parasitic relation holding over word forms as wholes, whereby the member of a paradigm (a grammatical word) seems to be formed directly on another member of the paradigm. In a modern adaptation of the ancient treatment, Matthews (1991) proposes to capture this relationship by means of a *metarule*, that is a generalisation over rules of stem formation. In this case the metarule should refer to the set of Latin stem formation rules for the PAST PARTICIPLE, and derive from them a corresponding set for the FUTURE PARTICIPLE. Aronoff (1994) objects that there is little reason for taking the Latin PAST PARTICIPLE as the base stem form from which all others should be derived, since there is no evidence that any of these forms is semantically or morphologically primary with respect to any other. He then goes on to suggest to factor out the *common formal core* shared by the forms in question (say *amat-*) and associate it with a purely morphological index, the *third stem*, accounting for its paradigmatic distribution. Aronoff claims that all stems enjoy the property of being *forms without morphosyntactic meaning*. For this reason they are called *morphomes*, or purely morphologically defined constructs, much closer to theme vowels than to inflectional endings.

In Aronoff's view, not all stems are equal; some of them are, in a sense, more interesting than others, depending on the extent to which they meet the following criterial properties:

- a. stems are meaningless
- b. stems are the input of morphological realisation rules of a language and enjoy as such a special status, as independent parts of the morphological system
- c. stems are formal functions whose output may vary considerably according to the verb to which they apply

How many Latin stem types meet all three properties above?

Aronoff observes that only the three traditionally recognised Latin *basic stem types*, namely the *present stem*, the *perfect stem*, and what he calls the *third stem* (used, as we saw, as a basis for the formation of PAST PARTICIPLE, SUPINE and FUTURE PARTICIPLE forms) satisfy a, b. and c. above to the full.

To make this point clear, it is useful to consider in more detail a Latin stem type which meets such conditions only partially, namely the so-called *b-stem*, governing the realisation of IMPERFECT and FUTURE INDICATIVE forms (as in *amabam* '(I) was loving' and *amabo* '(I) will love'). The *b-stem* is not meaningful, as not all imperfective tenses of Latin conjugation are realised upon it: so condition a. is met. Moreover, the *b-stem* plays a special part in the Latin verb system due to its quasi-systematic distribution across Latin conjugation paradigms, thus meeting condition b. as well.⁷ As a formal function, however, its output is completely predictable morphologically: in all Latin verbs of *-ā* and *-ē* conjugations, the FUTURE and IMPERFECT tenses are formed by adding certain person and number suffixes to a stem which is itself *always* built on the PRESENT stem by means of the suffix Vb. This is true of *all* Latin verbs, whether they exhibit variable stem functions or not.⁸

To sum up, all Latin stems are phonologically non predictable, intraparametrically redundant sound forms. In addition, basic stems have the extra property of being not always morphologically predictable, or, in Aronoff's terminology, of being variable formal functions. Note that, for what has been said so far, the establishment of a basic stem type should be motivated *on the basis of the conjugation system of a language as a whole*, rather than being decided on a verb by verb basis. Only if a subclass of verbs exhibits i) formal unpredictability in the formation of a paradigm, then *S* deserves being promoted to the status of basic stem. In fact, in regular Latin verbs of *-ā* conjugation, all stems (including basic stems) can be built upon the PRESENT stem through predictable suffixation (see Table 7 below). This has obvious consequences on the way this information is taken care of in the lexicon, but is entirely orthogonal to the issue of establishing basic stem types. On the other hand, in Latin, the highly suppletive nature of the PRESENT INDICATIVE of SUM⁹ 'be' is not as such a sufficient reason for establishing independent stem types, as no other Latin verb (arguably with the only exception of VOLO 'want') presents the same paradigmatic distribution of alternate stems.

In what follows, we adhere to the bulk of Aronoff's analysis, while departing from it on one terminological point. In fact, following

Scalise (1994), we consider the theme vowel as an integral part of the verb stem, in keeping with the morphological analysis of the Italian verb sketched in section 2.1 above. In other words, any stem should, by definition (*contra* what explicitly assumed by Aronoff in his analysis of the Latin verb system: 'I conclude that the theme vowel occurs basically in the present stem for all Latin verbs and in other stems only when they are built on the present stem' (1994, p. 52)), contain a theme vowel. Accordingly, *amat-* is a stem root of the PAST PARTICIPLE of AMARE (i.e. the stem minus its theme vowel), and not a whole stem in its own right. This entails that the formal redundancy that Aronoff considers to hold between stems will be taken here to involve stem roots: for example, the stems *visō-* (PAST PARTICIPLE) and *visī-* (SUPINE) are not identical forms unless one abstracts away from their thematic vowels. This seems linguistically correct since *selection* of a theme vowel in Latin (as well as in Italian) is governed solely by lexical-grammatical factors: i.e., by the conjugation class of the verb and the paradigmatic slot in question.¹⁰ For example both PAST PARTICIPLE and FUTURE PARTICIPLE select an *ō*-ending stem, while SUPINE requiring the theme vowel *ī*: this is entirely independent of the formal variability of the stem function in question. Likewise, the Italian forms *perse* ('(s)he lost', PASSATO REMOTO, 3RD PERSON SINGULAR) and *perso* ('lost', PAST PARTICIPLE, MASCULINE SINGULAR) share the same stem root, but select different thematic vowels (*e* in the PASSATO REMOTO and *o* in the PAST PARTICIPLE). Hereafter, we then will use the Aronovian notion of basic stem (hereafter *BS*) to refer to basic stem roots rather than stems proper. For what has been said so far, the formal variability in stem functions investigated in this paper involves stem roots only.

2.1.2. *BS distribution and paradigmatic partition classes*

Aronoff's compelling reconsideration of the role of stems in inflectional morphology turns out to be particularly instrumental for describing the structure of verb paradigms at an appropriate level of abstraction. It is useful to consider, in this context, some of the formal properties shared by Aronoff's *BSs*, to evaluate their impact on the analysis of distributional intraparadigmatic redundancies.

First, it should be observed that establishment of *BSs* formally induces a one-to-one correspondence between sets of paradigmatic slots, on the one hand, and the *BSs* themselves on the other hand. This can be represented explicitly through an (abstract) *indexing schema* such as the one in Table 6, where the indexed variables S_i s in the leftmost column range over stem roots, and paradigmatic slots

are grouped as extensionally-defined sets in the other column. Each such a set is named by a distinct capital letter, *A*, *B* or *C*. For the sake of readability, slots are referred to through the partial paradigms to which they belong: accordingly, 'prs_i' stands for PRESENT INDICATIVE, 'impf_i' for IMPERFECT INDICATIVE, and so on and so forth. Finally, the following equivalences hold: $S = \text{PRESENT } BS$, $S_2 = \text{PERFECT } BS$, $S_3 = \text{THIRD } BS$.

Table 6

Latin Indexing Schema (active voice)	
S	\leftrightarrow $A = \text{prs}_i, \text{impf}_i, \text{fut}_i, \text{prs}_s, \text{imp}_s, \text{prs_imp}, \text{fut_imp}, \text{prs_g}, \text{prs_prt}, \text{prs_inf}$
S_2	$B = \text{prf}_i, \text{fprf}_i, \text{pprf}_i, \text{prf}_s, \text{pprf}_s, \text{prf_inf}$
S_3	$C = \text{pft_prt}, \text{fut_prt}, \text{fut_inf}, \text{sup}$

The schema is limited to the ACTIVE voice and enforces what Stump (1995) calls *stem indexing*, namely the assignment of an index to a stem (a stem root in our case), for the latter to be appropriately selected by a morphological realisation rule. Given a slot, a realisation rule looks first for the stem root instantiating the indexed variable associated with that slot.

It should be observed that the Latin PRESENT INDICATIVE stem root *S* acts as a kind of *default*: unless explicitly stated to the contrary, all other stems are built on *S* through morphologically predictable realisation rules (see Table 7 below). As a corollary of the most restrictive version of the principle of Paradigmatic Integrity mentioned in section 2, $A \cap B = A \cap C = B \cap C = \emptyset$, where ' \emptyset ' indicates the empty set, meaning that there is no single paradigmatic slot which belongs to more than one such a set. This, together with the further assumption that the union of *A*, *B* and *C* yields back the set *P* of slots making up the entire Latin verb paradigm, can be restated more formally by saying that the set $\{A, B, C\}$ is a *partition* of *P*. We can eventually describe an indexing schema as a function from a set of *BSs* onto subsets of paradigmatic slots as follows:

$$F: \{S_i\} \rightarrow 2^{|P|}$$

where $2^{|P|}$ defines the number of all possible subsets which can be

extracted from a set of *P* elements. Crucially, $F(S_i)$ induces a partition of *P*. We shall return to this in section 4.2.2.

Accordingly, Aronoff's *BSs* are pointers to *partition classes* (*PCs*) of paradigmatic slots. This way of looking at them throws in sharp relief their systematic distribution across a paradigm, independently of considerations about their form. We can thus say that the establishment of *S* as a default *BS* is supported, among other things, by its being by far the most widely distributed *BS* in terms of the cardinality of the partition class *A* with which it is associated. Furthermore, reference to partition classes makes it possible to come up with interesting interparadigmatic generalisations, that is generalisations holding across paradigms. For example, one can describe the shift from a paradigm with fewer *BSs* to one with more of them as the result of class *A* being gradually shrunk. Finally, partition classes have obvious consequences on learning strategies. A learner, equipped with an indexing schema like in Table 6, can easily infer all Latin grammatical forms which are built on - say - *S*, once (s)he knows at least one of the forms belonging to *S* partition class.

If each single slot in the Latin verb paradigm is assigned an appropriate indexed variable according to the indexing schema of Table 6, one obtains a *distribution schema* such as the one in Table 7 overleaf, which, for reasons of space, is again limited to the active voice only. In the table, examples are given for two verbs, the regular *AMO* 'love' (example 1), and the sub-regular *SONO* 'play' (example 2), which shows variable stem functions. Note, incidentally, that identity of an index across two or more slots of Table 7 is not to be understood so as to imply surface formal identity of the corresponding stem roots. For example, the *IMPERFECT INDICATIVE* stem root is formally distinct from the one of *PRESENT INDICATIVE*, in spite of their both being associated with *S* in Table 7.¹¹ Still both stem roots presuppose a common base, namely *S*, and this captures a non-negligible amount of intraparadigmatic formal redundancy. Similarly, the *PLUPERFECT* is built upon S_2 , the *SUPINE* upon S_3 , etc.

Table 7. A Distribution Schema of Latin Conjugation

FINITE FORMS			
<i>Tense / mood</i>	<i>Basic stem</i>	<i>example1</i>	<i>example2</i>
PRESENT INDICATIVE	S_1	<i>amo</i>	<i>sono</i>
IMPERFECT INDICATIVE	S_1	<i>amabam</i>	<i>sonabam</i>
FUTURE INDICATIVE	S_1	<i>amabo</i>	<i>sonabo</i>
PRESENT SUBJUNCTIVE	S_1	<i>amen</i>	<i>sonem</i>
IMPERFECT SUBJUNCTIVE	S_1	<i>amarem</i>	<i>sonarem</i>
PRESENT IMPERATIVE	S_1	<i>ama</i>	<i>sona</i>
FUTURE IMPERATIVE	S_1	<i>amato</i>	<i>sonato</i>
PERFECT INDICATIVE	S_2	<i>amavi</i>	<i>sonui</i>
FUTURE PERFECT INDICATIVE	S_2	<i>amabero</i>	<i>sonuero</i>
PLUPERFECT INDICATIVE	S_2	<i>amaveram</i>	<i>sonueram</i>
PERFECT SUBJUNCTIVE	S_2	<i>amaverim</i>	<i>sonuerim</i>
PLUPERFECT SUBJUNCTIVE	S_2	<i>amavissem</i>	<i>sonuissem</i>
NON FINITE FORMS			
<i>Tense / mood</i>	<i>Basic stem</i>	<i>example1</i>	<i>example2</i>
PRESENT GERUND(IVE)	S_1	<i>amandum</i>	<i>sonandum</i>
PRESENT PARTICIPLE	S_1	<i>amans</i>	<i>sonans</i>
PERFECT PARTICIPLE	S_3	<i>amatus</i>	<i>sonitus</i>
FUTURE PARTICIPLE	S_3	<i>amaturus</i>	<i>soniturus</i>
FUTURE INFINITIVE	S_3	<i>amaturus esse</i>	<i>soniturus esse</i>
PERFECT INFINITIVE	S_2	<i>amavisse</i>	<i>sonuisse</i>
PRESENT PARTICIPLE	S_1	<i>amans</i>	<i>sonans</i>
SUPINE	S_3	<i>amatum</i>	<i>sonitum</i>
PRESENT INFINITIVE	S_1	<i>amare</i>	<i>sonare</i>

Following Aronoff, we can consider this type of redundancy as purely morphological: barring possible phonological readjustments, it is expected to hold consistently throughout an entire Latin paradigm.

2.2. Scope of present work

Latin conjugation is remarkably well-behaved in the way partial paradigms correlate with Partition Classes (*PCs*). As illustrated in Table 6, in Latin it is almost never the case that the slots of a given

partial paradigm (say the PRESENT INDICATIVE slots) are distributed across more than one PC.¹² Italian offers a considerably different picture. As Maiden (1995a) puts it, "a major innovation of the Romance languages is the introduction of patterns of stem allomorphy into the present tense, with considerable disruption of the previous (i.e. Classical Latin) one-to-one relations between form and meaning. In the subsequent reorganizations of these patterns of allomorphy, a new factor, *conjugation*, plays an important role: allomorphy tends to be eliminated from the first conjugation; *elsewhere it tends to be augmented*" (emphasis ours).¹³

Let us consider the PRESENT INDICATIVE of FARE 'do' (Table 8).

Table 8

FARE: PRESENT INDICATIVE				
SINGULAR			PLURAL	
1	2	3	1	2
'fat tjo	'fai	'fa	fat tjamo	'fate
				'fanno

The range of attested forms in the paradigm, taken at face value, seems to lend support to the establishment of two nearly suppletive BSs, namely [f(a)] and [fatt], say S_1 and S_2 respectively, whose distribution hardly correlates with any systematic variation in the array of instantiated morphosyntactic properties. One can then account for it in terms of the underlying indexing schema of Table 9.

Table 9

FARE: PRESENT INDICATIVE Indexing Schema	
$S_1 = [f(a)]$	$A = \{2s, 3s, 2p, 3p\}$
$S_2 = [fatt]$	$B = \{1s, 1p\}$

It is debatable whether the distribution of Table 8 in and by itself favours such a paradigmatic treatment unquestionably. We agree with Vogel (1994) that no piecemeal evidence of this sort imposes as such the establishment of independent BSs. BSs are not necessarily the best solution to stem suppletion if the latter is shown to be somewhat exceptional, as in the case of SUM in Latin conjugation (see also section 4.2.3). Evidence supporting the need for BSs must be sought after throughout the entire verb system of the language, to eventually reflect a property of the system, not of single verbs.

Let us consider now a different example, the present indicative active of RISCHIARE 'risk' in Table 10.

Table 10

RISCHIARE: PRESENT INDICATIVE				
SINGULAR			PLURAL	
1	2	3	1	2
'riskjo	'riski	'riskja	ris'kjamo	ris'kjate
				'riskjano

The paradigm here shows two surface alternants, [riskj] and [risk]. Their formal relation has a natural phonological explanation in terms of glide assimilation (Table 11 below). Furthermore, the distribution of the two alternants across the paradigm can be characterised as follows: [riskj] accompanies with all endings except those beginning with [i, j] (i.e. 2ND PERSON SINGULAR, and 1ST PERSON PLURAL). This distribution can be explained if one assumes that the following phonological rule be operative (Scalise 1983):

Table 11. Rule of Glide Assimilation

$$[j] \rightarrow \emptyset / \text{---} \left[\begin{array}{c} i \\ j \end{array} \right]$$

This evidence most clearly disfavours the hypothesis that the distribution of [riskj] and [risk] be captured paradigmatically, i.e. by means of an indexing schema. It is reasonable to posit the existence of one underlying $S = [riskj]$, whose surface variant [risk] is accounted for as the result of the application of glide assimilation (Table 11) in the context created by an underlying stem and a surface inflectional ending. This treatment is syntagmatic, as it crucially relies on the co-occurrence of phonological material in context.

The examples considered so far represent two somewhat extreme cases, calling for radically different formal treatments. On the one hand, selection of a stem can be contingent on a purely paradigmatic indexing. On the other hand, its form and distribution can be determined entirely by its syntagmatic phonological context. There exist, however, somewhat intermediate cases which are more difficult to analyse. Let us consider first the PASSATO REMOTO of MUOVERE 'move':

Table 12

MUOVERE: PASSATO REMOTO			
SINGULAR		PLURAL	
1	2	3	1
'mossi	mwo'vesti	'mosse	mwo'vemmo
			mwo'veste
			'mossero

Here the distribution of two nearly suppletive stem roots, namely [mwov] and ['moss],¹⁴ hardly correlates with any systematic variation of morphosyntactic feature content. Observe further, however, that [mwov] occurs only in arhizotonic forms, while ['moss] being always stressed. This is a good example of what Carstairs (1990) dubs *phonologically-conditioned suppletion*, a phenomenon which Stump (1995) shows being common to other languages than Italian. In our terminology, phonologically-conditioned suppletions are an example of how unpredictability of BS can correlate with a phonologically-predictable distribution.

Another less known but equally problematic case is the PAST PARTICIPLE of CONOSCERE 'know' (Table 13 below).

Table 13

PRESENT INDICATIVE		PAST PARTICIPLE	
SINGULAR		MASCULINE	
1	2	SINGULAR	
ko'nosko	ko'noffi	kono'fjuto	

In the PRESENT INDICATIVE, the alternation [ko'nosk, ko'no'fj] in Table 13 is due to a process of velar palatalization, taking place before an inflectional ending beginning with a front vowel (see section 4.1.2). The PAST PARTICIPLE [kono'fjuto], however, is an apparent exception to this phonological generalisation, which would predict *[konos'kutol]. Some solutions can be entertained to salvage the phonological coherence of this data. They will be considered in some detail in section 4.2.4.1. Suffice it to point out now that all of them appear to be highly marked, and that they ultimately rely on the sort of paradigmatic indexing they are intended to dispense with. We suggest here that this case belongs to a wide family of similar cases where phonological predictability of stem formation is paired with an apparently purely morphological indexing.

To sum up, the examples considered so far can be classified according to Carstairs's (1988) four-way typology of distribution and shape of morphs shown in Table 14 below.

Table 14

	phonologically unpredictable distribution	phonologically predictable distribution
dissimilar form	FARE	MUOVERE
similar form	CONOSCERE	RISCHIARE

The case of RISCHIARE clearly falls outside the range of a paradigmatic investigation, calling for a purely syntagmatic, phonological treatment. All other cases, however, pose a serious challenge, to any coherent formal description. Under normal circumstances, the two classificatory dimensions of stem form and distribution should exhibit a high degree of correlation. If a formal similarity is phonological, then it is expected to correlate with phonologically coherent embedding contexts. On the other hand, cases of suppletion should by definition distribute purely morphologically, that is independently of recurrent phonological contexts. The expected correlation is repeatedly infringed by the evidence presented so far. The PASSATO REMOTO of MUOVERE exhibits both suppletive stems and a phonologically-conditioned distribution of them. The case of CONOSCERE, if our analysis is correct, is the mirror image of MUOVERE: although its stem roots are subject to an ordinary process of velar palatalization, the palatalised alternant also occurs in non-palatalising contexts. In fact velar palatalization is a synchronically unproductive phonological rule of Italian, and belongs as such to the family of exceptional phonological rules also known in the literature as *minor rules* (Lightner 1968, Hudson 1974). Note, incidentally, that minor rules are usually lexically conditioned. The case of CONOSCERE introduces a further complication, as it shows an instance of paradigmatic conditioning on the application of a minor rule to which CONOSCERE is subject.

The intricacy of these data calls for a less anecdotal investigation. In the following pages, we suggest that *all alternating stem roots which are not accountable in terms of exceptionless phonological rules of Italian are to be considered as independent BSs in Aronoff's sense*. The consequences of this strongly paradigmatic hypothesis will then be evaluated against more traditional syntagmatic accounts of the same range of phenomena. In particular, in section 3 we illustrate the paradigmatic distribution of alternating stem roots due to i) phonologically-conditioned suppletion, ii) application of minor rules, both lexically and paradigmatically conditioned, and iii) full suppletion, as they happen to be attested in the entire Italian conjugation.

In section 4 an analysis of the data of section 3 is carried out by contrasting the descriptive and explanatory adequacy of the phonological (or syntagmatic) and purely morphological (or paradigmatic) views. It turns out that the paradigmatic distribution of stem allomorphy of Italian verb inflection, far from exhibiting an erratic behaviour (as suggested by their being recalcitrant to universal principles of morphological naturalness (Dressler and Thornton, 1991)) is in fact most tightly constrained on a purely paradigmatic basis. In this overall picture, sheer exceptions no longer lie outside of the grammatical space, but rather define its boundaries. Instead of being subject to route memorization, they appear to significantly regiment word learning strategies.

3. The data

In this section we will be concerned with the distribution schemata of alternating verb stem roots in Italian conjugation, to show their range of variation for each partial paradigm considered. As already pointed out above, each variable S_1 will be bound to a distinct formal redundancy, under the usual assumption that an identical redundancy is found in all slots which are marked for S_1 . Clearly each such variable is a local, intraparadigmatically-bound variable: in other words, formal identity holds only relative to a specific paradigm or, equivalently, to a specific verb V . As already anticipated in section 2.2, exceptionless purely phonological stem changes will not be part of the following overview.

3.1. Present indicative active

Italian verbs present up to 4 different BSs in the PRESENT INDICATIVE. We provide here an overview of all varieties of stem shape and distribution attested in the PRESENT INDICATIVE paradigm, starting with verbs exhibiting two BSs.

3.1.1. Two BSs

Verbs with two basic stem types in the present indicative can be clustered into three groups, each of which instantiates a partly different distribution schema.

The CONOSCERE schema

The by far most substantial part of Italian verbs with two stem

forms in the PRESENT INDICATIVE follows the schema of CONOSCERE 'know', whose PRESENT INDICATIVE paradigm is repeated in Table 15 below, together with its corresponding distribution schema (bottom line of the table):

Table 15

CONOSCERE: PRESENT INDICATIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
ko'nosko	ko'noʃʃi	ko'noʃʃe	konoʃʃamo	konoʃʃete	ko'noskono
S_2	S	S	S	S	S_2

Verbs belonging to this class (57 irregular stems)¹⁵ exhibit, in most cases, a phonologically fairly stable pattern of alternation, which can formally be described as a palatalization process taking place before a front vowel (section 4.1.2). Velar palatalization affects 46 basic irregular verbs: AFFLIGGERE 'bore, pester', ASPERGERE 'sprinkle', ASSURGERE 'rise', CINGERE 'wreathe, surround', *CORGERE, CONOSCERE 'know', CONVERGERE 'converge', CRESCERE 'grow', *DURRE, *MERGERE, ERGERE 'stand, rise up', ESIGERE 'require, demand', FIGGERE 'stick', FINGERE 'pretend', FRANGERE 'break', FRIGGERE 'fry', FUGGERE 'escape', FUNGERE 'act as', GIUNGERE 'arrive', INDULGERE 'indulge', LEGGERE 'read', MESCERE 'pour', MUNGERE 'milk', NASCERE 'be born', PASCERE 'feed', PIANGERE 'cry', PORGERE 'hand', PREDILIGERE 'prefer', PROTEGGERE 'protect', PUNGERE 'prick', REDIGERE 'compile', REGGERE 'hold', RIFULGERE 'shine', *RIGERE, SORGERE 'rise', SPARGERE 'scatter', SPENGERE 'extinguish, turn off', SPINGERE 'push', STRINGERE 'hold tight', STRUGGERE 'melt', TERGERE 'wipe away', TINGERE 'paint', TORCERE 'twist', UNGERE 'oil', VINCERE 'win', VOLGERE 'turn'. A minority of verbs (9) exhibits [g] insertion (as in *pongo/poni*, see section 4.1.3) before back vowel: COGLIERE 'pick', PORRE 'put', RIMANERE 'remain', SALIRE 'go up', SCEGLIERE 'choose', SCIOGLIERE 'loose', TOGLIERE 'take away', TRARRE 'draw', VALERE 'be worth'. Of these, SCEGLIERE, SCIOGLIERE and TOGLIERE undergo lateral palatalization before front vowel. TRARRE also exhibits lengthening of the inserted [g] (section 4.1.1). Finally, the verb APPAIRE 'appear' undergoes r-drop (section 4.1.7), and the verb NUOCERE 'harm' exhibits both diphthongization (section 4.1.5) and lengthening.

The range of phonological processes involved here is illustrated in Table 16 below through some examples.

