

The paradigmatic dimension of stem allomorphy in Italian verb inflection

Vito Pirrelli & Marco Battista

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
			a'mjino

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 *amatū-* through addition of *-ūrō-*.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 *amatū-* or *visū-*, 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 meaningful/less
- 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, intraparadigmatically 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 $A = \text{prs}_i, \text{impf}_i, \text{fut}_i, \text{prs}_s, \text{imp}_s, \text{prs}_\text{imp}, \text{fut}_\text{imp}, \text{prs}_g, \text{prs}_\text{prt}, \text{prs}_\text{inf}$
S_2	$B = \text{prf}_i, \text{fprf}_i, \text{pprf}_i, \text{prf}_s, \text{pprf}_s, \text{prf}_\text{inf}$
S_3	$C = \text{pft}_\text{prt}, \text{fut}_\text{prt}, \text{fut}_\text{inf}, \text{sup}$

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 BS s are pointers to *partition classes* (PC s) 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 BS s 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 (PC s). 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.

Table 16

TYPE	EXAMPLE	ENGLISH GLOSS
velar palatalization	[di'riŋgo, di'ridʒi]	(I) direct/(you) direct
[g]-insertion	['valgo, 'vali]	(I) am worth/(you) are worth
[g]-insertion + lengthening	['traggo, 'trai]	(I) draw/(you) draw
[g]-insertion + palatalization	['ʒlgo, 'ʒʌʎi]	(I) loose/(you) loose
[r]-drop	[appajo, appari]	(I) appear/(you) appear
diphthongization + lengthening	[nwɔtʃɔ, 'nwɔtʃi]	(I) do harm/(you) do harm

The PIACERE schema

This schema covers 4 base verbs, one of which is PIACERE 'like' (Table 17).

Table 17

PIACERE: PRESENT INDICATIVE		
SINGULAR		PLURAL
1	2	3
'piatʃto	'piatʃi	'piatʃtʃamo
S ₂	S	S ₂
		'pia'tʃete
		S
		S ₂

Phonologically, this stem alternation consists of consonantal lengthening, a phenomenon common to two further base verbs of the same class, GIACERE 'lie' and TACERE 'be silent'. Finally, in this class we find PARERE 'seem', which exhibits r-drop (Table 18).

Table 18

TYPE	EXAMPLE	ENGLISH GLOSS
palatal lengthening	'piatto/'piati	(I) like/(you) like
[r]-drop	'pajo/'parsi	(I) am worth/(you) are worth

The UDIRE schema

This schema holds for 2 base verbs only,¹⁶ namely SEDERE 'sit' and UDIRE 'hear'.

Table 19

UDIRE: PRESENT INDICATIVE		
SINGULAR		PLURAL
1	2	3
'ɔdo	'ɔdi	u'djamo
S ₂	S ₂	S
		S
		S ₂

In Table 19, S₂ shows ablauting of stem initial vowel (section 4.1.6). SEDERE further undergoes diphthongization of stressed vowel as shown in Table 20.

Table 20

TYPE	EXAMPLE	ENGLISH GLOSS
ablauting	'ɔdo, u'djamo	(I) hear/(we) hear
diphthongization	'sjeɔo, se'djamo	(I) sit/(we) sit

3.1.2. Three BSs

The grammatical forms of this class call for introduction of further indices, namely S₃/S₄. They distribute differently depending on individual verbs. This variation gives rise to three different classes.

The FINIRE schema

This schema, exemplified by the PRESENT paradigm of the verb FINIRE 'finish' of Table 21, holds for about 450 base irregular verbs.

Table 21

FINIRE: PRESENT INDICATIVE			
SINGULAR		PLURAL	
1	2	3	1
fi'nisko	fi'niʃi	fi'niʃe	fi'njamo
S ₂	S ₃	S ₃	S
			fi'nite
			S
			S ₂

The vast majority of the verbs belonging to this group consists of verbs exhibiting both [isk] insertion (section 4.1.4) and velar palatalization of the inserted augment. A small subclass of verbs in this class undergoes [g] insertion and diphthongization: DOLERE 'hurt' (in its *reduced* PRESENT INDICATIVE paradigm, as opposed to a richer variant with four alternating stem roots instead of three, see section 3.1.3), TENERE 'keep, hold' and VENIRE 'come'. Finally, the verb USCIRE 'go out' undergoes ablauting plus velar palatalization, while the verb MORIRE 'die' has diphthongization and r-drop. The range of phonological processes involved here are illustrated in Table 22 through some examples.

gization (Table 26). This schema accounts for the PRESENT INDICATIVE of POTERE 'can, be able' (Table 27).

Table 26

TYPE	EXAMPLE	ENGLISH GLOSS
lateral palatalization + diphthongization	'sɔλλo/'swɔli/ so'lete	(I)/(you)/sing)/(you/plur) are used

Table 27

POTERE: PRESENT INDICATIVE			
SINGULAR		PLURAL	
1	2	3	1
'posso	'pwɔi	'pwɔ	pos'sjamo
S ₂	S ₃	S ₃	S ₂
			po'tete
			S
			S ₂

3.1.3. Four BSs

Four is the maximum number of different BSs which are possibly found in the Italian PRESENT INDICATIVE. There being no attested variation in the distribution of S₄, one single schema exists.

The DOVERE/DOLERE schema

The group includes the verbs DOVERE and DOLERE, whose PRESENT INDICATIVE paradigms are given below. Recall that both paradigms present another distribution with three alternating stem roots only (section 3.1.2). A further index is introduced here to account for doubts such as ['debbo] (S₄) for ['devo] (S) '(I) must', and [doλλ'amo] (S₄) for [do'bjamo] (S) '(we) hurt'.

Table 28

DOLERE AND DOVERE: PRESENT INDICATIVE			
SINGULAR		PLURAL	
1	2	3	1
'dolgo	'dwɔli	'dwɔle	doλλ'amo
'debbo	'devi	'deve	do'b'jamo
S ₂	S ₃	S ₃	S ₄
			S
			S ₂

Note that the verb DOLERE exhibits [g] insertion, diphthongization and lateral palatalization; on the other hand, DOVERE undergoes ablauting, labialization and lengthening (Table 29).

Table 22

TYPE	EXAMPLE	ENGLISH GLOSS
[iskl]-insertion + palatalization	fi'nisko/fi'niʃi/fi'njamo	(I)/(you)/(we) end
[g]-insertion + diphthongization	'vengo/'vjɛni/'ve'njamo	(I)/(you)/(we) come
ablauting + velar palatalization	'esko/'ɛʃi/'jamo	(I)/(you)/(we) go out
[r]-drop + diphthongization	'mwojo/'mwɔri/'mo'rjamo	(I)/(you)/(we) die

The DOVERE (reduced) schema

The group includes the verb DOVERE (in its reduced PRESENT INDICATIVE paradigm, as opposed to another possible instantiation with four stem alternants, shown in section 3.1.3).

Table 23

DOVERE: PRESENT INDICATIVE			
SINGULAR		PLURAL	
1	2	3	1
'devo	'devi	'deve	do'b'jamo
S ₂	S ₂	S ₂	S ₄
			S
			S ₂

Here stem alternation is realised phonologically through ablauting in stressed closed syllables, accompanied by labialization and lengthening before glide (Table 24).

Table 24

TYPE	EXAMPLE	ENGLISH GLOSS
ablauting+labialization+lengthening	'devo/dob'b'jamo/ do'vete	(I)/(we)/(you) must

The SOLERE schema

The schema is illustrated by the verb SOLERE 'be used'.

Table 25

SOLERE: PRESENT INDICATIVE			
SINGULAR		PLURAL	
1	2	3	1
'sɔλλo	'swɔli	'swɔle	soλλ'amo
S ₂	S ₃	S ₃	S ₂
			S
			S ₂

The verb SOLERE exhibits lateral palatalization and diphthong-

Table 29

TYPE	EXAMPLE	ENGLISH GLOSS
ablauting+labialization+lengthening	'devo/dob'bjamo/ do'vete	(I)/(we)/(you) must
[g]-insertion+diphthongization+lateral palatalization	'dølgo/dw'oli/ døl'lamo	(I)/(we)/(you) are used

3.2. Present imperative

The Italian present imperative borrows the 3RD PERSON SINGULAR, 1ST PERSON PLURAL and 3RD PERSON PLURAL forms of the PRESENT SUBJUNCTIVE in the corresponding slots. All in all, it shows a degree of complexity comparable with that of the PRESENT INDICATIVE. It exhibits up to four different alternating stem roots, whose indices covary with those of PRESENT INDICATIVE and SUBJUNCTIVE BSs. Accordingly we define the following three classes, and for each class, some different distribution schemata.

3.2.1. Two BSs

The CONOSCERE schema

Table 30

CONOSCERE: PRESENT IMPERATIVE		
SINGULAR		PLURAL
1	2	3
–	ko'noʃi	ko'noska
	S ₂	S ₂
		konoʃ'fete
		S
		S ₂

The PIACERE schema

Table 31

PIACERE: PRESENT IMPERATIVE		
SINGULAR		PLURAL
1	2	3
–	'pjatʃi	'pjatʃja
	S	S ₂
		'pjatʃ'fete
		S
		S ₂

The UDIRE schema

Table 32

UDIRE: PRESENT IMPERATIVE		
SINGULAR		PLURAL
1	2	3
–	'odi	'oda
	S ₂	S ₂
		u'djamo
		S
		u'dite
		S
		S ₂

3.2.2. Three BSs

The FINIRE schema

Table 33

FINIRE: PRESENT IMPERATIVE		
SINGULAR		PLURAL
1	2	3
–	fi'niʃi	fi'niska
	S ₃	S ₂
		fi'njamo
		S
		fi'nite
		S
		S ₂

The DOVERE (reduced) schema

Table 34

DOVERE: PRESENT IMPERATIVE (REDUCED)		
SINGULAR		PLURAL
1	2	3
–	'dèvi	'dèva
	S ₂	S ₂
		dob'bjamo
		S ₄
		do'vete
		S
		S ₂

3.2.3. Four BSs

The DOVERE/DOLERE schema

Table 35

DOVERE: PRESENT IMPERATIVE		
SINGULAR		PLURAL
1	2	3
–	'dèvi	'debba
	S ₃	S ₂
		dob'bjamo
		S ₄
		do'vete
		S
		S ₂

3.3. Present subjunctive

The PRESENT SUBJUNCTIVE paradigm is considerably simpler than the PRESENT INDICATIVE paradigm, and exhibits two classes only.

3.3.1. One BS

The PIACERE schema

This distribution schema contains one stem only, which however does not correspond to default S_1 , but to S_2 in the PRESENT INDICATIVE.

Table 36

PIACERE: PRESENT SUBJUNCTIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'pjajʃtta	'pjajʃtta	'pjajʃtta	pjajʃtjamo	pjajʃtjate	'pjajʃtjano
S_2	S_2	S_2	S_2	S_2	S_2

3.3.2. Two BSs

The VENIRE schema

Table 37

VENIRE: PRESENT SUBJUNCTIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'venga	'venga	'venga	ve'njamo	ve'njate	'vengano
S_2	S_2	S_2	S_2	S_2	S_2

Note again that the two indexed stem variables, S_2 and S_1 , must be instantiated by the same formal redundancies found in the PRESENT INDICATIVE.

The DOLERE schema

This schema covers only those few verbs with four alternate stems in the PRESENT INDICATIVE paradigm (section 3.1.3). It enforces the constraint that the stems in the first and second person plural of the PRESENT SUBJUNCTIVE must be based on that found in the first person plural of the PRESENT INDICATIVE (S_4).

Table 38

DOVERE: PRESENT SUBJUNCTIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'debba	'debba	'debba	dob'bjamo	dob'bjate	'debbaano
S_2	S_2	S_2	S_4	S_4	S_2

3.4. Passato remoto

3.4.1. Two BSs

We already considered above the PASSATO REMOTO of MUOVERE, which is repeated here for the reader's convenience:

Table 39

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

The paradigm instantiates the following distribution schema:

Table 40

PASSATO REMOTO					
SINGULAR			PLURAL		
1	2	3	1	2	3
S_5	S_5	S_5	S_5	S_5	S_5

where S_5 is the PASSATO REMOTO stem root, and S_5 the default PRESENT INDICATIVE stem root. The phonological processes involved in the formation of S_5 are highly heterogeneous, including root vowel lengthening, ablaut, augmentation of the root, sandhi (section 4.1.8) and combination of these. Examples of each type are given in the table below.

Table 41

S	S ₅	ENGLISH GLOSS
fat/	'fet/	'do'
*'dut/	*'duss	'know'
ko'nol/	ko'nobb	'come'
ven	'venn	'put'
'pon	'poz	'draw'
'tra	'trass	'lose'
'perd	'pers	'happen'
sut/'tjed	sut/'tjess	'live'
'viv	'viss	'cleave'
'jind	'jiss	'hang'
ap'pend	ap'pes	'defeat'
scon'figg	scon'fiss	'spray'
as'perd3	as'pers	'melt'
'fond	'fuz	'excel'
et/'tjell	et/'tjels	'expel'
es'pell	es'puls	'compress'
kom'prim	kom'press	'run'
'korr	'kors	'shake'
'skwot	'skoss	'cook'
'kwot/	'koss	'move'
'mwov	'moss	'be worth'
'val	'vals	

There is no attested distribution schema of PASSATO REMOTO with more than two BSs.

3.5. Imperfect indicative / subjunctive: S everywhere

Both IMPERFECT INDICATIVE and SUBJUNCTIVE in Italian exhibit the same systematic formal predictability in terms of stem formation as their paradigmatically homologous counterparts in Latin conjugation. The processes involved are nonetheless different. With both regular and sub-regular verbs, the stem root of the IMPERFECT INDICATIVE is formed upon the PRESENT stem (S + theme vowel) through simple addition of [v] (see Table 42).

Table 42

S	IMPERF. IND. STEM ROOT	ENGLISH GLOSS
<i>am</i>	<i>amav</i>	'love'
<i>and</i>	<i>andav</i>	'go'
<i>dov</i>	<i>dovav</i>	'must'

Similarly, the stem root of the IMPERFECT SUBJUNCTIVE is formed upon S + theme vowel by attaching [ss] (see Table 43).

Table 43

S	IMPERF. SUBJ. STEM ROOT	ENGLISH GLOSS
<i>am</i>	<i>amass</i>	'love'
<i>and</i>	<i>andass</i>	'go'
<i>dov</i>	<i>dovass</i>	'must'

3.6. Future indicative and present conditional

Irregular FUTURE INDICATIVE and PRESENT CONDITIONAL paradigms present one and the same S₆, found nowhere else in the paradigm, as illustrated in the tables below:

Table 44

VENIRE: FUTURE INDICATIVE			
SINGULAR		PLURAL	
1	2	3	1
ver'ro	ver'rai	ver'ra	ver'remo
S ₆	S ₆	S ₆	S ₆
			ver'ranno
			S ₆
			S ₆

Table 45

VENIRE: PRESENT CONDITIONAL			
SINGULAR		PLURAL	
1	2	3	1
ver'rei	ver'resti	ver'rebbe	ver'remmo
S ₆	S ₆	S ₆	S ₆
			ver'reste
			S ₆
			S ₆

By default, FUTURE INDICATIVE and PRESENT CONDITIONAL stems are formed upon S by adding [er].

3.7. Past participle

The PAST PARTICIPLE stem root of sub-regular verbs can be indexed in two different ways: as an unrelated BS (S₇) found nowhere else in the paradigm, or as S₅, that is coindexed with the PASSATO REMOTO BS (section 3.4). There is a further default possibility

that we do not consider here for the moment, namely that the PAST PARTICIPLE is formed regularly on the basis of default S.

3.7.1. S₇; the SECERNERE schema

Table 46

S	S ₇	ENGLISH GLOSS
fət/	'fatt	'do'
'dʌtʃ/	'dott	'put'
'pɒn	'post	'draw'
'trɑ	'tratt	'defeat'
skɒn'fɪdʒdʒ	son'fitt	'cook'
'kwɔtʃ/	'kott	

3.7.2. S₅; the MUOVERE schema

Table 47

S	S ₅	ENGLISH GLOSS
'pɜd	'pers	'lose'
sʌtʃ'tʃɛs	sʌtʃ'tʃɛs	'happen'
'vɪv	'viss	'live'
'fɪnd	'fiss	'cleave'
ap'pɛs	ap'pɛs	'hang'
as'pɛrdʒ	a'spɛrs	'spray'
'fɒnd	'fuz	'melt'
ɛtʃ'tʃɛl	ɛtʃ'tʃɛl	'excel'
ɛs'pɛl	ɛs'pɛl	'expel'
kɒm'prɪm	kɒm'prɛs	'compress'
'kɒr	'kɒrs	'run'
'skwɔt	'skɒs	'shake'
'mwɔv	'mɒs	'move'
'vɒl	'vɒl	'be worth'

3.8. Infinitive

Under normal circumstances, the Italian INFINITIVE is formed on S. A minority of verbs, namely CONDURRE, PORRE, TRARRE, call for coindexing with the FUTURE INDICATIVE and PRESENT CONDITIONAL idiosyncratic stem root (S₆; see section 3.6). Note, however, that most verbs showing S₆ in the FUTURE INDICATIVE and PRESENT CONDITIONAL, have in fact S in the INFINITIVE slot. Finally, the verb BERE shows a unique S₈ in the PRESENT INFINITIVE ([b-]), different from both S = ['bev] and S₆ = [berr].

3.9. Present participle and gerund

As in the case of IMPERFECT, both regular and irregular verbs form the stem roots of PRESENT PARTICIPLE and GERUND by adding [nt] and [nd] respectively to S + theme vowel (see Table 48).

Table 48

S	PRES. PART. STEM ROOT	GERUND STEM ROOT	ENGLISH GLOSS
am	amant	amand	'love'
and	andant	andand	'go'
dov	dovant	dovand	'must'

3.10. Overall distribution schema

If one picks up, for each partial paradigm type, the distribution schema specified for the maximum number of stem indices, and charts the selected schemata all together into one comprehensive table, the entire range of stem root variability in Italian conjugation is represented as the unique Overall Distribution Schema (ODS) in Table 49 below (Pirrelli and Battista 1996, Battista and Pirrelli 1997, 1998).

Table 49

	FINITE FORMS					
	SINGULAR			PLURAL		
	1	2	3	1	2	3
PRESENT SUBJUNCTIVE	S ₂	S ₂	S ₂	S ₄	S ₄	S ₂
PRESENT INDICATIVE	S ₂	S ₃	S ₃	S ₄	S ₄	S ₂
IMPERFECT INDICATIVE	S	S	S	S	S	S
IMPERFECT SUBJ.	S	S	S	S	S	S
PASSATO REMOTO	S ₆	S	S ₆	S	S	S ₅
PRESENT IMPERATIVE	-	S ₃	S ₂	S ₄	S	S ₂
PRESENT CONDITIONAL	S ₆	S ₆	S ₆	S ₆	S ₆	S ₆
FUTURE INDICATIVE	S ₆	S ₆	S ₆	S ₆	S ₆	S ₆

NON FINITE FORMS	
PRESENT GERUND	S
PRESENT PARTICIPLE	S
PAST PARTICIPLE	S ₇
PRESENT INFINITIVE	S ₆

The schema is abstract, in the sense that there is no attested Italian verb exhibiting a different stem form in each partition class identified by recurrent BSs in Table 49. In other words, there is no single Italian verb which exhibits a maximum number of BSs in *all* its partial paradigms. In fact, the maximum number of stem alternants witnessed in Italian conjugation is found in the verb *DOLERE* 'hurt', which shows six different cases of such variation (with BSs S_7 and S_8 in Table 49 being replaced by S).

An interesting point worth mentioning here is that all distributional schemata of Italian verbs, both fully regular and less regular ones, with the only exception of 8 highly suppletive verbs, are, in one way or another, a simplified version of Table 49. This simplification can be described as a systematic *reduction* in the number of possibly instantiated different variables with no reshuffling of their corresponding partition classes. We will return to this point in section 4.2. Suffice it to say at this stage that the 8 truly exceptional base verbs are:

AVERE 'have', ESSERE 'be', ANDARE 'go', DARE 'give', FARE 'do, make',
STARE 'stay, be', DIRE 'say, tell', SAPERE 'know'

All of them are very frequent verbs. It would certainly be interesting to illustrate, in some detail, the extent to which these verbs infringe *ODS*, but this would lead us too far. It is nonetheless worth noting here that *ODS* still captures a considerable portion of the formal redundancy exhibited by the paradigms of these exceptional verbs, in spite of their showing many typical signs of idiosyncratic inflectional behaviour, such as total suppletion, selection of highly idiosyncratic inflectional endings, Priscianic (or parasitic) formations etc.

4. Analysis of the data

In this section, we analyse the data illustrated in section 3 from a syntagmatic (section 4.1) and paradigmatic (section 4.2) perspective. The merits of the two analyses will be discussed in some detail and some preliminary conclusions are drawn (section 4.2.5).

4.1. The Phonological dimension

4.1.1. Consonant lengthening

In Italian conjugation, consonant lengthening takes place in i)

PRESENT INDICATIVE alternations like [ʔatʔo, ʔafj] '(I) be silent, (you) be silent' or [pjatʔo, pjatʔj] '(I) like, (you) like', where a lengthened palatal is found before back vowel in the PRESENT INDICATIVE and SUBJUNCTIVE paradigms, as well as ii) some PASSATO REMOTO alternations such as [kaddi, ka'desti] '(I) fell, (you) fell'.

Wanner (1972) provides a non trivial phonological analysis of the PRESENT INDICATIVE/SUBJUNCTIVE alternation, under the assumption that consonant lengthening requires an underlying glide, which derives, in turn, from an underlying theme vowel, according to the following derivation of the form [ʔatʔo] from underlying /t ā k + ē + ɔ̄/:

Table 50

	/t ā k + ē + ɔ̄/	/t ā k + ē + ɪ̄/
thv shortening		----
glide formation	j	----
elision	j	----
laxing	-----	-----
palatalization	ǎ	-----
glide-drop	tʃ	tʃ
other-rules	[ʔ a tʃ o]	[ʔ a tʃ i]

Wanner's account is compelling, but it requires that glide formation and elision be in a bleeding relationship in order to account for the derivation of [ʔatʔj] (with no lengthening) from underlying /tākēi/ in Table 50. Arguably, it would make sense to let both *thv shortening* (i.e. thematic vowel shortening) and *glide formation* take a free ride on underlying /t ā k + ē + ɪ̄/: elision could then be invoked to simply repair the Italian phonotactically non admissible vowel cluster [ji] (through a rule like in Table 11). Admittedly, this proposal would run into problems with the first person plural forms [ta'tʃamo, dʒa'tʃamo], as opposed to [pjatʔtʃamo], while a derivation à la Wanner could simply enforce a reversal of rule ordering between elision and glide formation to account for [ta'tʃamo, dʒa'tʃamo]. Order reversal is nonetheless non trivial as it requires that different rule orderings be conditioned on specific paradigmatic slots. In discussing data of Italian conjugation, Wanner himself casts serious doubts on the ultimate effectiveness of rule ordering as a means of explaining application (or failure of application) of a phonological process such as elision in certain environments: "Local ordering may have its merits in ordering two rules with respect to one form where both possible orderings will yield derivations in which both rules have participated. But in our case the typical relation between rules and a given set of forms is that out of a number of rules only one can apply [...]. What

changes from one type of derivation to the other is the application or non-application of the rule. For these reasons, no specific proposal about rule ordering can possibly accommodate the true generalizations" (ibid., p. 315).

As to consonant lengthening in the *PASSATO REMOTO* ([kaddi, ka'destj]), it is interesting to note that although its application is apparently governed by stress placement, we are aware of no attempt in the literature to provide a thorough characterisation of this phenomenon in purely phonological terms. Suffice it to point out, in this context, that this alternation distributionally parallels other clear cases of suppletion, such as [mossi, mw'vesti], and thus is a natural candidate for paradigmatic indexing, in spite of its apparent underlying phonological motivation.

4.1.2. Palatalization

This phenomenon includes both velar and lateral palatalization and affects a large class of verbs whose stem final consonant is palatalized in the environment of an ensuing front vowel. These alternants are natural candidates for a purely phonological treatment. The phonological argument, in its classical attire, applies to forms of the *PRESENT INDICATIVE*. It is on these forms that we focus in this section. In particular we will refer to verbs belonging to the *CONOSCERE* type of the present indicative paradigm (3.1.1), but we will also mention verbs of other classes.

Table 51

<i>DIRIGERE</i> : PRESENT INDICATIVE				
SINGULAR		PLURAL		
1	2	3	1	2
di'riɡo	di'ridʒi	di'ridʒe	diri'dʒ(j)amo	diri'dʒete
				di'riɡono

Note that palatalization, in Italian, is triggered by [e, i, j] and is limited to C2/C3 verbs only. C1 verbs with a velar-ending stem never undergo palatalization, as shown by the present indicative of C1 *MANCARE* 'miss' below.

Table 52

<i>MANCARE</i> : PRESENT INDICATIVE				
SINGULAR		PLURAL		
1	2	3	1	2
'manko	'manki	'manka	man'kjammo	man'kate
				'mankano

The extent to which C3 verbs undergo palatalization is debatable (Wanner, *ibid.*). [isk]-verbs (see section 4.1.4 below) exhibit a palatal alternant of the augment, namely [iʃ], when fronted by [i, e, j]. Nonetheless, no [isk]-stem in its augment-less form appears to palatalise before a front vowel, even in those cases where its derivational base, usually an adjective, does palatalise, as shown by the following forms of the verb *INSELVATICHIARE* 'get wild', parasynthetically derived from *SELVATICO* ([sel'vatiko] 'wild'), which palatalises in the *MASCULINE PLURAL*: [sel'vatitʃi].

Table 53

<i>INSELVATICHIARE</i> : PRESENT INDICATIVE				
SINGULAR		PLURAL		
1	2	3	1	2
inselvati'kisko	inselvati'kiʃi	inselvati'kiʃe	inselvati'kjamo	inselvati'kite
				inselvati'kiskono

Various attempts have been made in the literature to relate lack of palatalising C1 stems to the phonological content of their thematic vowel ([a]). As Wanner points out, however, this move leads to an open inconsistency in the rule-ordering of theme vowel elision and velar palatalization, as illustrated by the following two derivations:

Table 54

elision	/vink + e + o/	/vink + e + i/
palatalization	----	----
other-rules	[vinko]	tʃ vintʃi]

Table 55

palatalization	/mank + a + o/	/mank + a + i/
elision	----	----
other-rules	[manko]	[manki]

Matthews (1981) provides evidence in support of the idea of reinterpreting palatalization as a case of velarization of an underlying palatal stem, in open contrast with historical evidence. This is borne out by interparadigmatic distributional redundancies and will be considered in more detail in section 4.1.3.

It is useful to note at this point that, in Italian conjugation,

palatalization of C2 stems overapplies systematically in the default PAST PARTICIPLE forms, and underapplies in cases of erroneous regularization of PRESENT SUBJUNCTIVE forms. To illustrate, given the phonological alternations [ko'nosko, ko'noʃʃi] '(I) know, (you) know', ['kresko, 'kreʃʃi] '(I) grow up, (you) grow up', [mesko, 'meʃʃi] '(I) pour, (you) pour', [pasko, 'paʃʃi] '(I) feed, (you) feed', overt phonological evidence would predict PAST PARTICIPLE forms such as *[konos'kuto] vs attested [konoʃʃuto], *[kres'kuto] vs [kreʃʃuto], *[mes'kuto] vs [meʃʃuto], *[pas'kuto] vs [paʃʃuto] (Table 56). To our knowledge, this exception is never considered in the phonological literature on the argument. A reasonable attempt to salvage this phonological inconsistency would be to assume that [konoʃʃuto] comes from /konos'keto/, with an underlying /-e-/ theme vowel which is never found in the PAST PARTICIPLE of any C2 verb and is historically fictitious, although a theme vowel is normally found in the PAST PARTICIPLE of regular C1 and C3 verbs ([sen'tito, a'mato]). Eventually, theme vowel /e/ can be turned into [u] after velar palatalization takes place. We will return to this analysis in section 4.2.4.1.

Table 56

Environments triggering palatalization/velarization			
front vowels	glide	back vowels	
ko'noʃʃi	konoʃʃ(j)amo	konoʃʃuto	
'kreʃʃi	kreʃʃ(j)amo	kreʃʃuto	
'meʃʃi	meʃʃ(j)amo	meʃʃuto	
'paʃʃi	paʃʃ(j)amo	paʃʃuto	

An interesting case of underapplication of palatalization is provided by evidence from solecisms in spoken Italian. We intend to refer here to cases of overregularization of PRESENT SUBJUNCTIVE forms of C2 verbs which are wrongly inflected according to C1 present subjunctive endings (see Table 57, where a question mark accompanies solecisms).

Table 57

ANDARE: PRESENT SUBJUNCTIVE					
SINGULAR		PLURAL			
1	2	3	1	2	3
'vada ↓	'vada ↓	'vada ↓	an'djamo	an'djate	'vadano ↓
? 'vadi	? 'vadi	? 'vadi			? 'vadino

Such a shift of conjugational class has the immediate effect of fronting verb stems undergoing palatalization with the triggering environment [j]. The resulting outcome, however, contradicts phonological predictions, as in all these cases the stem preserves its velar in final position: so we have ?['kreskino], ?[di'riginolo] instead of the phonologically expected *['kreʃʃino], *[di'ridʒino].

Table 58

CRESCERE: PRESENT SUBJUNCTIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'kreska ↓	'kreska ↓	'kreska ↓	kreʃʃamo	kreʃʃate	'kreskano ↓
? 'kreski	? 'kreski	? 'kreski			? 'kreskino

4.1.3. Velar deletion/insertion

VENIRE 'come' is among those verbs which exhibit [g]-deletion/insertion in some slots of PRESENT INDICATIVE (compare ['vengo] '(I) come' with [ve'nite] '(you-plur) come'). While diachronic evidence seems to provide arguments in support of the insertion hypothesis (Rohlf's 1966, Wanner 1972), the synchronic analysis of the same data offered by Vogel (1994) favours [g]-deletion in the environment of an ensuing front vowel. This open contradiction is not necessarily damning for either hypothesis. In fact, nothing opposes in principle to a synchronic reanalysis of conjugation data reversing the base-derived relationship between stems in the grammar by abduction, contrary to diachronic evidence (Andersen 1972).

Both hypotheses, however, run into problems with some attested forms. To understand why, let us consider Wanner's analysis of the alternation ['valgo, 'vali] '(I) am worth, (you) are worth', in terms of velarization:

Table 59

	/v̄ a l + ē + ð/	/v̄ a l + ē + ɪ/
thv shortening	ɪ	---
glide formation	j	---
elision	---	---
laxing	ä	---
velarization	g	---
other-rules	[v a l g o]	[v a l i]

In the derivation of ['vali] velarization does not apply, due to the thematic vowel being deleted at an early stage of the derivation by a rule of elision. It would be difficult to account for the alternation ['traggo, 'trai] along the same lines, especially if one considers that consonantal lengthening is convincingly accounted for by Wanner as triggered by a following glide, which is in turn derived from a theme vowel (see section 4.1.1. above). Here, it is the glide itself that should be lengthened. On the other hand, consider an alternation like ['kɔlgo, 'kɔλλi] '(I) pick, (you) pick'. Vogel's approach would call for velar deletion in underlying /kɔlɡ/, with consequent lateral palatalization of /l/ before /i/. The latter process is, however, both phonologically poorly motivated and lexically-governed, due to its being inoperative in the derivation of ['vali] given above. A simpler account is proposed by Matthews (1981), who hypothesises an underlying /kɔλ/, where [λ] is neutralised to [l] in ['kɔlto], the sequence [λt] being a phonotactically impossible Italian consonant cluster. By the same token, if one assumes that velarization of glide is at work in ['kɔlgo] (along the lines sketched above for ['valgo]), then the resulting segment cluster /λɡ/ would similarly be neutralised into [lg]. The same paradigmatic opposition with 1ST PERSON SINGULAR and 3RD PERSON PLURAL forms appears to suggest, according to Matthews, a reanalysis of palatalization as a corresponding process of velarization: thus [kɔndutʃ] → [kɔnduk]. Fanciullo (1998) revisits Matthews' analysis to suggest that [-go] in Medieval Italian ['dʒungo] '(I) arrive' has undergone a morphological reanalysis as a neutralising PRESENT INDICATIVE ending: [-go] was eventually extended to other non etymological forms such as ['vengo] to *preventively* avoid nasal palatalization before back vowels (e.g. ['vɛn.no]) which Fanciullo considers a marginal process, fundamentally extraneous to the diachronic development of Italian. The last point, however, is counterintuitive and clashes with the ubiquitous extension of palatalised alternants attested in Italian dialects.

As will be shown later on in the paper, the seemingly "miraculous" *en block* insertion of [g] in verbs where it was not present etymologically should rather be accounted for as the joint effect of *paradigmatic* (as opposed to *derivational*) constraints. Suffice it to observe here that a fundamental problem with derivational accounts (whether based on velar insertion or deletion) is, once more, over- and under-application of phonological generalisations within the paradigm of verbs, such as VENIRE, that belong to the PRESENT INDICATIVE schema of FINIRE (Table 21). The two contexts referred to here are paradigmatically identical to the ones already mentioned in section

4.1.2: overregularization of PRESENT SUBJUNCTIVE endings (?['vengino]), and PAST PARTICIPLE formation ([ve'nutolo]). Here, phonological arguments would predict *[vjenino], with diphthongization of stressed mid vowel, and *[ven'guto].

4.1.4. Augment insertion / deletion

In Italian, [isk]-verbs exhibit a typical alternation with and without their augment in PRESENT INDICATIVE forms, as illustrated by the verb FINIRE 'end' below:

Table 60

FINIRE: PRESENT INDICATIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
f'nisko	f'nijji	f'nijje	f'njamo	f'nite	f'niskono

Distribution of the augment correlates with stress placement, the augment being inserted before unstressed inflectional endings only. Historically, this phenomenon has been explained as generalising stress on a termination (Rohlf's 1966). In a similar vein, Di Fabio (1990) proposes a synchronic account whereby augment insertion is invoked for reasons of prosodic uniformity. Alternatively, Vogel (1994) sees it as the process of deleting [isk] from an underlying augmented stem, in the appropriate phonological environments. Carstairs (1988) casts some doubts on Vogel's analysis, on grounds that her solution requires "brute force" and "unmotivated and rather unnatural phonological rules" (1988: 72).

Mathews (1981) observes that any attempt to explain the distribution of [isk] on phonological grounds does, in fact, explain very little from a descriptive viewpoint. In Italian, he argues, stress movement is a systematic feature of the entire conjugational system, and there is no general evidence that this should, in and by itself, trigger either augmentation or augment deletion. Compare, for example, regular PRESENT INDICATIVE forms such as ['mando, man'djamo], or, the accents of the IMPERFECT INDICATIVE, [man'davo, manda'vamo, manda'vate], where transferring of stress does not seem to have any consequences on either the root or the syllabic structure of the IMPERFECT INDICATIVE stem.

A piece of significant evidence supporting the non phonological origin of augment insertion is provided by the often neglected existence of a group of Italian verbs which have doublets in all SINGULAR

persons and in the THIRD PERSON PLURAL form of PRESENT INDICATIVE, one with and the other without augment: see, for example, verbs such as *ABORRIRE* 'abhor' ([a'borro, abor'risko], '(I) abhor'), *APPLAUDIRE* 'applaud' ([ap'plau^o, applau'disko], '(I) applaud'), *ESEGUIRE* 'carry out' ([e'zegwo, eze'gwisiko], '(I) carry out'), *INGHIOTTIRE* 'swallow' ([in'gjøtto, ingjøt'tisko], '(I) swallow'), etc.

4.1.5. Diphthongization

Diphthongization involves mid vowels in stressed open syllables, as shown by the PRESENT INDICATIVE paradigm of *SEDERE* 'sit' below:

Table 61

SEDERE: PRESENT INDICATIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'sjedo	'sjedi	'sjede	se'djamo	se'dete	'sjedono

This is also found in some verbs with more than two PRESENT INDICATIVE alternating stem roots, namely *DOLERE* 'suffer', *MORIRE* 'die', *POTERE* 'can', *TENERE* 'hold', and *VENIRE* 'come', as shown in the following table.

Table 62

DOLERE, MORIRE, POTERE, TENERE AND VENIRE: PRESENT INDICATIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'dolgo	'dwoli	'dwale	do'l'lammo	do'lete	'dolgono
'mwɔjo	'mwɔri	'mwɔre	mo'rjamo	mo'rite	'mwɔjono
'pɔsso	'pwɔi	'pwɔ	pos'sjamo	po'tete	'pɔssono
'tengo	'tjeni	'tjene	te'njamo	te'nete	'tengono
'vengo	'vjeni	'vjene	ve'njamo	ve'nite	'vengono

It is interesting to note here that, diphthongization being synchronically inoperative in Italian, some irregular verbs (*CUOCERE* 'cook', *MUOVERE* 'move', *SCUOTERE* 'shake') exhibit extended diphthongization (marked in bold in the tables below) also in unstressed open syllables (see Table 63), while retaining the monophthong in closed syllables (see Table 64).

Table 63

PRESENT INDICATIVE OF CUOCERE, MUOVERE AND SCUOTERE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'kwɔtjo	'kwɔtji	'kwɔtje	kwɔ'tjamo	kwɔ'tjete	'kwɔtjono
'mwɔvo	'mwɔvi	'mwɔve	mwɔ'vjamo	mwɔ'vete	'mwɔvono
'skwɔto	'skwɔti	'skwɔte	skwɔ'tjamo	skwɔ'tete	'skwɔtono

Table 64

PASSATO REMOTO OF CUOCERE, MUOVERE AND SCUOTERE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'kɔssi	kwɔ'tjesti	'kɔsse	kwɔ'tjemmo	kwɔ'tjeste	'kɔssero
'mɔssi	mwɔ'vesti	'mɔsse	mwɔ'vemmo	mwɔ'veste	'mɔssero
'skɔssi	skwɔ'testi	'skɔsse	skwɔ'temmo	skwɔ'teste	'skɔssero

The verb *NUOCERE* 'harm' shows a similar behaviour, compounded with the further complication of having a doublet diphthongized stem form (in bold in Table 65 below) also in stressed closed syllables, in the present indicative and subjunctive forms.

Table 65

NUOCERE: PRESENT INDICATIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'nwɔtjjo	'nwɔtji	'nwɔtje	nwɔ'tjamo	nwɔ'tjete	'nwɔtjono
or					or
'nɔtjjo					'nɔtjono

Note here that the form [nwɔtjjo] can be explained phonologically by stating that diphthongization is ordered before lengthening. This, however, is incompatible with the ordering required by the form [nɔkkwi] '(I) harmed', where diphthongization is bleed by consonant lengthening.¹⁷ It should be noted, incidentally, that even phonological approaches to stem alternation agree to assign a morphological status to stem alternation induced by consonant lengthening in the passato remoto (Table 66). As we will see in the following section this casts some doubts on the overall attempt of accounting for these data phonologically.

Table 66

NUOCERE: PASSATO REMOTO					
SINGULAR		PLURAL			
1	2	3	1	2	3
'nɔkkwi	nwo'tjesti	'nɔkkwe	nwo'tjemmo	nwo'tjeste	'nɔkkwero

As a further phonological exception, SEDERE exhibits extended diphthongization in unstressed open syllables in the FUTURE INDICATIVE and PRESENT CONDITIONAL forms, contrary to phonological expectations, which are instead met by MORIRE 'die' (Table 67 and Table 68).

Table 67

FUTURE INDICATIVE OF SEDERE AND MORIRE					
SINGULAR		PLURAL			
1	2	3	1	2	3
sjede'ro	sjede'rai	sjede'ra	sjede'remo	sjede'rete	sjede'ranno
mori'ro	mo'rirai	mo'rira	mori'remo	mori'rete	mori'ranno

Table 68

PRESENT CONDITIONAL OF SEDERE AND MORIRE					
SINGULAR		PLURAL			
1	2	3	1	2	3
sjede'rei	sjede'resti	sjede'rebbe	sjede'rmmo	sjede'reste	sjede'rebbero
mori'rei	mori'resti	mori'rebbe	mori'rmmo	mori'reste	mori'rebbero

To sum up, only 3 basic verbs, out of a total of 10 verbs undergoing diphthongization, exhibit a phonologically-predictable distribution of diphthongized alternants: DOLERE, MORIRE and POTERE. All other present cases of over- and under-application of *prima facie* phonological processes.

4.1.6. Ablauting

Ablauting is found in some PRESENT INDICATIVE, SUBJUNCTIVE and IMPERATIVE forms as well as some PASSATO REMOTO and PAST PARTICIPLE forms. Some relevant examples are given in the tables below:

Table 69

PRESENT INDICATIVE OF UDIRE AND USCIRE					
SINGULAR		PLURAL			
1	2	3	1	2	3
'ɔdo	'ɔdi	'ɔde	u'djamo	u'dite	'ɔdono
'ɛsko	'ɛjji	'ɛjje	u'jjamo	u'jjite	'ɛskono

Table 70

PASSATO REMOTO OF METTERE, FARE AND VEDERE					
SINGULAR		PLURAL			
1	2	3	1	2	3
'mizi	met'testi	'mize	met'temmo	met'teste	'mizero
'fetji	fa'tjesti	'fetje	fa'tjemmo	fa'tjeste	'fetjero
'vidi	ve'desti	'vide	ve'demmo	ve'deste	'videro

As with other cases of PASSATO REMOTO alternation, ablauting applies before unstressed endings only. Nonetheless, it would be very difficult to provide a synchronic phonological description of these facts. Most of them are in fact due to etymological Latin ablauting ([fakjo, 'feki]), a phenomenon already poorly productive in classical Latin. Finally, a particularly complex case is represented by the alternation ['ɛsko, 'ɛjji, u'jjite] in the PRESENT INDICATIVE of the verb USCIRE 'go out', which Tekavčić (1980, 1988) has unconvincedly tried to interpret on a purely phonological basis, and Maiden (1995b) considers, in line with the analysis suggested in this paper, the result of the "mutual interplay between a stress pattern, a lexico-semantic analogy [with the word *uscio* 'door'], and an *abstract inherent property of the verbal paradigm*" (p. 41, translation and emphasis ours).

4.1.7. R-drop

R-drop is the name of a phonological rule introduced by Wanner (1972) to account for an alternation of the type ['mwɔjo, 'mwɔri] and ['pajo, 'pari], whereby an /r/ is expected to be dropped in the context of an ensuing glide.

Table 71

	/m ɔ r + i + ɔ/	/m ɔ r + i + i/
thv shortening	i	---
glide formation	j	---
elision	---	---
r-drop	---	---
other-rules	[m w ɔ j ɔ]	[m w ɔ r i]

This account poses the same problem encountered in the parallel derivation of [ʔatʃɔ] in section 4.1.1, since it predicts a non existing *[mo'jamo] (as in [pa'jamo]),¹⁸ instead of the attested [mo'rjamo]. Moreover, the highly *ad hoc* nature of this rule seems to strongly recommend a morphological treatment.

4.1.8. Sandhi and conversion

Under this catch-all category we place a motley variety of outstanding phonological phenomena which take place in the formation of PAST PARTICIPLE and PASSATO REMOTO stem roots of irregular verbs.

Rules of sandhi are invoked by Matthews (1991) to provide a phonological account of forms such as [vɔlsi, 'vɔlto] '(I) turned, turned', from underlying /vɔlg+s+i, vɔlg+t+ɔ/. As shown by Matthews himself, these processes, however phonologically motivated (Italian shows no overt consonantal clusters such as [gt] or [gs]) do not follow from the rules of phonology alone, due to the existence of a number of forms, such as [skɛsso] from /skɛt+s+ɔ/ or ['pozi] from /pon+s+i/ which would require *ad hoc* conditioning of these processes both lexically and paradigmatically.

For the sake of completeness, we also mention here a morphological rule by which an irregular PAST PARTICIPLE stem root in [tt] (e.g. [skɔnfitt]) is turned into the corresponding PASSATO REMOTO stem root [skɔnfiss] by means of a minor phonological rule. This is proposed by Vogel (1994) to ensure full formal identity between PAST PARTICIPLE and PASSATO REMOTO stem roots, under the assumption that lack of formal identity between the two is merely due to the morpho-phonological readjustment [tt] → [ss]. In fact, Vogel's rule is capable of relating phonologically only a subset of the cases where PASSATO REMOTO and PAST PARTICIPLE forms appear not to coincide phonologically in Italian, as shown by the following list.

Table 72

S ₅	S ₇	ENGLISH GLOSS
'fet] kon'duss 'vid 'poz	'fatt kon'dott 'vist 'post	'do' 'guide' 'see' 'put'

It is not clear whether Vogel would be willing to introduce further conversion rules to account for all these additional cases of formal mismatching. Be that as it may, the sort of rule proposed by Vogel is both phonologically unmotivated and entirely *ad hoc*.

4.1.9. Summary

The range of data illustrated in section 3 raises a serious challenge for any radical attempt to provide a coherently phonological characterisation of such data in syntagmatic terms only. Throughout section 4.1, we pointed out the following open issues:

RULE ORDERING INCONSISTENCIES:

we illustrated at least two classical examples of this, namely the interaction between thematic vowel elision and palatalization on the one hand, and the inconsistent order relationship between diphthongization and consonant lengthening on the other hand;

ABSENCE OF OVERT PHONOLOGICAL MOTIVATION OF ALLEGED PHONOLOGICAL PROCESSES:

this is the case, for example, of augment deletion/insertion, which is in fact hard to justify in terms of constraints over stress placement; an even trickier case is the treatment of consonant lengthening, which lends itself to an apparently straightforward phonological analysis in some partition classes only (e.g. PRESENT INDICATIVE, section 4.1.1), while being considered paradigmatically-governed in others (e.g. PASSATO REMOTO S₅);

NUMBER OF EXCEPTIONS

this is not only limited to lexical exceptions; we pointed out that even for those lexical items which should be marked as undergoing processes such as palatalization, diphthongization etc., there is a number of systematic overt exceptions awaiting an explanation;

DISTRIBUTIONAL CORRELATION BETWEEN PHONOLOGICAL AND MORPHOMIC ALTERNATIONS:

even when processes of stem alternation appear to distribute according to clearly phonologically-motivated contexts, it is often the case that a suppletive alternation exhibits the same distribution;

PARADIGMATIC CONDITIONING

an effective remedy to the systematic proliferation of exceptions to phonological generalizations seems to be conditioning these generalizations not only lexically, but also paradigmatically, for example, by inhibiting palatalization in PRESENT SUBJUNCTIVE slots.

All in all, the explanatory value of a purely syntagmatic phonological account of Italian conjugational data is poor. Arguably, it can only be salvaged at the price of severely curtailing its application domain through a battery of both lexical and paradigmatic constraints, as tentatively illustrated later on in the paper (section 4.2.5). But this entails acknowledging the existence of paradigm structures and their role in stem selection. It is to this issue that we turn now.

4.2. The paradigmatic dimension of Italian conjugation

4.2.1. Preliminaries

Similarly to what happens in Latin conjugation, all stems of Italian regular verbs are formed predictably upon the PRESENT INDICATIVE stem root (formally identical to the verb lexical root). Note that this is not incompatible with Dressler and Thornton's claim (1991) that Italian verb forms are regularly built upon two base forms, a rhototonic one (e.g. [am-] for AMARE, [tem-] for TEMERE etc.) and an arhototonic one (e.g. [a'ma-], [te'me-] etc.). While we agree with the two scholars that the alternation [am-, a'ma] is truly morphological, we observe, in keeping with the spirit of Aronoff's analysis, that the arhototonic base of regular verbs can always be derived from the lexical root through a constant and entirely predictable morphological process: namely theme vowel addition and stress shift. We thus conclude that Dressler and Thornton's arhototonic base does not need to be stipulated as an independent BS.

Table 73

FINITE FORMS		
TENSE / MOOD	EXAMPLE1	EXAMPLE2
PRESENT INDICATIVE	amo	valgo
IMPERFECT INDICATIVE	amavo	valevo
FUTURE INDICATIVE	amerò	varrò
PRESENT SUBJUNCTIVE	ami	valga
IMPERFECT SUBJUNCTIVE	amassi	valessi
PRESENT IMPERATIVE	ama	vali
PASSATO REMOTO	amai	valsì
FUTURE PERFECT INDICATIVE	avrò amato	sarò valso
PLUPERFECT INDICATIVE	avevo amato	ero valso
PERFECT SUBJUNCTIVE	abbia amato	sia valso
PLUPERFECT SUBJUNCTIVE	avessi lodato	fossi valso

NON FINITE FORMS		
TENSE / MOOD	EXAMPLE1	EXAMPLE2
PRESENT GERUND	amando	valendo
PRESENT PARTICIPLE	amante	valente
PERFECT PARTICIPLE	amato	valso
PRESENT INFINITIVE	amare	valere

The distribution schema of the paradigm of AMARE (a unique BS in all slots) is complied with by those regular verbs which exhibit phonologically predictable patterns of stem root alternation, as in the case of ['riskj, 'risk] considered in 2.2 above, but it is infringed by those verbs whose inflectional behaviour exhibits, in various combinations and to different degrees: i) variable stem formation, and ii) systematic allomorphy of inflectional endings. This is exemplified in the third column of Table 73, through the forms of VALERE 'be worth'. In a few cases, i) and ii) show up concurrently, but while an allomorphy in the inflectional ending of a slot *s* always presupposes a variable stem function being operative in *s*, the reverse implication is not true. An irregular stem can combine with a perfectly regular inflectional ending: actually this is the unmarked case (Carstairs 1987). We will briefly return to this point in the concluding section of this paper. Stem alternation will be the main focus of the following pages.

Variability of stem formation obfuscates the formal transparency of the morphological relationship with the PRESENT INDICATIVE *BS* to different degrees. This is certainly true when suppletion is involved. For example, *S* in the PASSATO REMOTO of MUOVERE (Table 13 above) can hardly be said to be formally simpler than *S*₅. Suppletion is nonetheless exceptional and exhibited only to a limited extent. An appropriate description of the inflectional behaviour of verbs with suppletive forms should specify as irregular only those stems which are not amenable to general processes of stem formation.

An additional difficulty connected with Italian data is that, unlike Latin, the notions *default BS* and PRESENT INDICATIVE *BS* are not always coextensive. As we saw in section 3.1, some Italian verbs show alternating stem roots in the PRESENT INDICATIVE itself. Which of the three alternating stem roots in the PRESENT INDICATIVE of - say - VENIRE is then intended when one talks of *default BS*? Different theoretical frameworks have addressed this question differently. Phonological simplicity has often been invoked as a paramount criterion for the establishment of *default BSs* in the context of Natural Morphology (Dressler 1985 and 1987, Dressler and Thornton 1991). Alternatively, generative approaches make appeal to the criterion of the overall simplicity of the grammar accounting for the data in question. For example, Vogel (1994) argues that, in the case of Italian [isk]-verbs (e.g. FINIRE), all forms are derived from a *BS* which includes the [isk] augment (e.g. [finisk], as opposed to [fin], for the verb FINIRE 'end') on grounds that augment deletion is more easily stated in phonological terms than augment insertion is (see section 4.1.4 for details).

The paradigmatic perspective which we intend to entertain here sees things in yet a different way. By using the weaponry of formal notions introduced in section 2, one can look at less regular paradigms as the result of a *default BS* being replaced in some slots by other, formally variable *BSs*. For reasons that will be clear in a moment, we can refer to this process as *re-indexing*. The less regular a verb is, the further this replacement goes. To illustrate this view, let us comparatively consider the PRESENT INDICATIVE of AMARE 'love', CONOSCERE 'know', VENIRE 'come' and DOLERE 'hurt', which exhibit a growing number of alternanting *BSs*, from 1 (AMARE) to 4 (DOLERE).

Table 74

AMARE, CONOSCERE, VENIRE, DOLERE: PRESENT INDICATIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'amo	'ami	'ama	a'mjamo	a'mate	'amano
ko'nosko	ko'noʃʃi	ko'noʃʃe	konoʃʃamo	konoʃʃete	ko'noskono
'vengo	'vjeni	'vjene	ve'njamo	ve'nite	'vengono
'dolgo	'dwoʎi	'dwoʎe	doʎ'ʎamo	doʎ'lete	'dolgono

Their corresponding distribution schemata are given below:

Table 75

AMARE, CONOSCERE, VENIRE, DOLERE: DISTRIBUTION SCHEMATA					
SINGULAR			PLURAL		
1	2	3	1	2	3
S	S	S	S	S	S
S ₂	S	S	S	S	S ₂
S ₂	S ₃	S ₃	S	S	S ₂
S ₂	S ₃	S ₃	S ₄	S	S ₂

Table 75 is to be read across rows, the formal identity enforced by indexed variables being bound to each single paradigm only. Use of the same variable in different rows deserves some further comments.

In this context, *S* is taken to instantiate the default stem root, while *S*₂ and *S*₃ ranging over distinct *BSs*. For the partial paradigm of the regular AMARE, this choice follows naturally from its being a completely regular verb. Some qualifications are in order to justify the distribution of *S* in the more complex schemata of verbs such as CONOSCERE and VENIRE. First, the reason of this distribution is not to be looked for *within* the PRESENT INDICATIVE partial paradigm only, but rather rests on the overall stem distribution in the verb paradigm. For example, other stem roots in the paradigm of VENIRE, e.g. the PAST PARTICIPLE and IMPERFECT INDICATIVE ones ([ve'nut, ve'niv] respectively) among others, happen to be formally constant and predictable. If we take this evidence at face value, we then have to conclude that, since all constant stem roots of VENIRE are formed upon [ven], it is [vən], and not - say - [vəng], that instantiates *S*. Otherwise, one would be forced to assume, contrary to intuition, that

there exist some stem roots which are still formally constant but are derived from a non default and ultimately irregular BS. We can dub this intuitive criterion the Paradigmatic Formal Consistency Principle (PFCP):

PARADIGMATIC FORMAL CONSISTENCY PRINCIPLE:

"Regular stem roots are assumed to be derived from default BSs"¹⁹ Application of PFCP to Table 75 amounts to a *maximally parsimonious re-indexing* in the transition from the distribution schema of *-say - AMARE* to that of *CONOSCERE*. In other words, the schema of *CONOSCERE* can be seen as derived from that of *AMARE* by changing variable indices in both the 1ST PERSON SINGULAR and the 3RD PERSON PLURAL, while leaving all other indices unaltered. Another conceivable way of deriving the same distribution would involve changing four indices out of six: this should be discounted on grounds of economy.

To sum up, in a paradigmatic perspective a default *S* is expected to satisfy the following two requirements: i) it is the base of regular stem roots (PFCP); ii) it is associated with the partition class with highest cardinality (this point is related to maximally parsimonious re-indexing).

4.2.2. Paradigmatic (Weak) Homomorphism

Table 75 shows that the transition from the distribution schema of the PRESENT INDICATIVE of a regular verb to that of a less regular verb seems to be governed by a maximally parsimonious re-indexing of BS variables, ultimately based on PFCP. In this section we will give a more formal characterisation of this behaviour and assess its scope in Italian conjugation. For this purpose, it is convenient to look at the gradual replacing of *S* by other indices as the inverse process of passing from a more irregular paradigm to a less irregular one, through a reduction in the number of alternating stem roots. To be more concrete, let us compare the distribution schemata of *DOLERE* and *VENIRE* in Table 75 above. If we look at the distribution schema of *DOLERE* as a reduced version of the schema of *DOLERE*, we obtain the following set of correspondences between the partition classes of the two partial paradigms:

Table 76

DOLERE: PCs		VENIRE: PCs
{1p} ∪ {2p}	→	{1p, 2p}
{1s, 3p}	→	{1s, 3p}
{2s, 3s}	→	{2s, 3s}

By the same token, the two-stem distribution schema of *-say - VALERE* (corresponding to the alternation [*valgo, vali*]) can be obtained by reducing the schema of *DOLERE* through set union over the partition classes associated with *S*, *S*₃ and *S*₄. Pirrelli and Battista (1999) formally describe this state of affairs by demonstrating that the transition from a distribution schema with more BSs to one with fewer BSs always induces a *weak homomorphism* over the corresponding partition classes. More intuitively, this amounts to the following

SCHEMA TRANSITION HYPOTHESIS (STH)

The only set operation involved in the transition from one distribution schema to another one with fewer BSs is *set union of partition classes*.

Let us consider some practical consequences of STH by looking at the distribution of stem indices in Table 75 above. The transition from a distribution schema with four stem indices (*DOLERE*) to a distribution schema with 3 indices (*VENIRE*) requires deletion of one of them (*S*₃ in the case at hand). In theory, this can take place in a number of ways, e.g. through a redistribution of the slots marked as *S*₃ over the remaining partition classes. STH makes the prediction that this transition only requires re-indexing of *S*₃ as one of the remaining variables, namely *S*₂ in the case at hand. All other possibilities are excluded *a priori*. In fact, STH makes no prediction as to what other index should be assigned to *S*₃. Given a distribution schema with *n* indices, the transition to a distribution schema with *n* indices can take place in *n* possible different ways, which is the number of the different possible indices that can be assigned to the stem variable to disappear. In fact, as we will see in more detail in section 4.2.3, STH defines an upper limit to the number of possible ways in which this can take place. In reality, the actual number of attested ways is considerably lower than the upper limit.

4.2.3. Beyond *STH*

If *STH* holds true, it then becomes possible to describe the entire range of distribution schemata attested in the conjugation of Italian as a function of re-indexing a unique comprehensive schema, namely the one expressing the entire range of stem root variability attested for Italian, already plotted as *ODS* in Table 49 above.

To illustrate this with a concrete example, suppose we want to derive all attested distribution schemata of the PRESENT INDICATIVE paradigm with two alternating stem roots only (section 3.1.1). Given the present indicative schema in *ODS* above, this can be done, for each attested type illustrated in section 3.1.1, as illustrated in the table below:

Table 77

distribution type	re-indexing
CONOSCERE	$S_4 \rightarrow S, S_3 \rightarrow S$
PIACERE	$S_4 \rightarrow S_2, S_3 \rightarrow S$
UDIRE	$S_4 \rightarrow S, S_3 \rightarrow S_2$

where ' \rightarrow ' means 're-indexed as'. It turns out that all distribution schemata given in section 3 can be derived from *ODS* through simple re-indexing.

It fact *STH* holds for the entire Italian conjugation system, with the only exception of the 8 highly irregular verbs listed in section 3.10. It should be appreciated that this is not a trivial consequence of the way *ODS* was compiled, namely by charting together, for each partial paradigm type, the attested distribution schema specified for the maximum number of alternating stem roots. First note that the paradigmatic space spanned by *ODS* is carved out into reasonably large partition classes, so that only a limited number of distribution schemata can be derived from it through re-indexing. This is pictorially illustrated in Table 78 below, where partition classes are represented as (possibly discontinuous) boxes, and the class A, corresponding to default *S*, has been shaded:

Table 78

	FINITE FORMS					
	SINGULAR			PLURAL		
	1	2	3	1	2	3
PRESENT SUBJUNCTIVE						
PRESENT INDICATIVE		B	C	D		B
IMPERFECT INDICATIVE		A				
IMPERFECT SUBJ.						E
PASSATO REMOTO	E					
PRESENT IMPERATIVE	-	C	B	D		
PRESENT CONDITIONAL				F		
FUTURE INDICATIVE						

NON FINITE FORMS

PRESENT GERUND	A
PRESENT PARTICIPLE	
PAST PARTICIPLE	G
PRESENT INFINITIVE	H

The correspondence between stem variables and partition classes is given, as a reminder, in the following Overall Indexing Schema (*OIS*):

Table 79

Overall Indexing Schema	
S	\leftrightarrow A
S_2	\leftrightarrow B
S_3	\leftrightarrow C
S_4	\leftrightarrow D
S_5	\leftrightarrow E
S_6	\leftrightarrow F
S_7	\leftrightarrow G
S_8	\leftrightarrow H

Perhaps the most telling way to show that not any distribution schema can be derived from *ODS* through *STH* is to briefly illustrate an exception. A case in point is the PRESENT INDICATIVE of *FARE* in Table 80.

Table 80

FARE: PRESENT INDICATIVE					
SINGULAR			PLURAL		
1	2	3	1	2	3
'fat/fo	'fai	'fa	fat/'t/amo	'fate	'fanno
S_2	S	S	S_2	S	S

First, it should be realised that this distribution schema cannot possibly be obtained from *ODS* in Table 49 through re-indexing only. Still, one could decide to modify *ODS* so as to account for the distribution schema of *FARE*, by assigning the 1ST SINGULAR and 3RD PERSON PLURAL slots two distinct indices (say S_2 and S_9 respectively), as illustrated below:

Table 81

PRESENT INDICATIVE				
SINGULAR		PLURAL		
1	2	3	1	2
S_2	S_3	S_3	S_4	S
			S	S_9

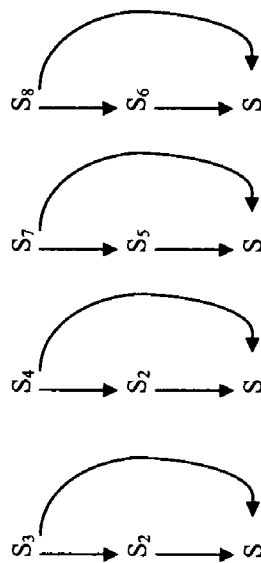
This is fine, although it is only one step removed from assigning each slot a different stem variable. More importantly, it contravenes one basic principle underlying *ODS*, namely that, for each partial paradigm, each distribution schema is instantiated by at least one existing verb. In fact, there is no existing verb in Italian whose present indicative shows the degree of variability assumed in Table 81. Hence, this distribution schema should be pruned out by the Occam razor, and the partial paradigm of *FARE* should eventually be counted as an exception.

Note finally that *OIS* in Table 79 has obvious consequences from the point of view of language acquisition. Each stem variable S_i is associated with a unique partition class. The 8 partition classes in *OIS* thus define the maximum range of stem variability an Italian speaker expects to find. This means that a speaker is in a position to reconstruct the entire Italian paradigm of any verb correctly after being exposed to 8 forms of this paradigm only, provided that each of these forms belongs to a different partition class of *OIS*. Note that, for what we said so far, there is no verb for which each such form will exhibit a different stem. For the majority of sub-regular verbs, only two or three different stems are found. With regular verbs, the same S is found in each partition class. This fact is bound to have an impact on the way this information is stored in the lexicon.

STH defines tight constraints on admissible distribution schemata in Italian conjugation. The paradigms of all verbs, no matter what class they belong to, must comply with *STH*. But there is more to it than *STH* is able to state. A number of distribution schemata which are compatible with *STH* are in fact never found in

Italian conjugation. For example, it is never the case that S_4 is re-indexed as S_3 , or that S_5 goes into S_4 . It is useful to represent the whole range of attested ways in which a *BS* variable is re-indexed in Italian conjugation as shown in Table 82 below, where re-indexing is pictorially represented by an arrow. Note that, due to *STH*, re-indexing maps one stem variable into one and only one other stem variable. If more than one arrow leaves the same variable in Table 82 below (as, for example, in the case of S_4) this means that the variable in question can be re-indexed in two alternative ways, thus giving rise to two distinct distribution schemata.

Table 82



The diagram in Table 82 highlights the role of S as a kind of ultimate default for all *BSs* in Italian conjugation. Note that there also exist some secondary or intermediate defaults, corresponding to S_2 , S_5 and S_6 , which can be both output and input of re-indexing. They represent intermediate defaults in the sense that they are themselves ultimately merged into S through a further step of paradigmatic levelling.

4.2.4. Stem shape and stem indexing

It is time to entertain both the phonological and paradigmatic perspective simultaneously, with a view to establishing their respective domains in the description of conjugation data in Italian. First, it should be observed that many of the partition classes we were able to identify in section 3 group phonologically consistent contexts. For example, in section 3.1 we described three attested distribution schemata with two PRESENT INDICATIVE *BSs* (summarised in Table 83 below for the reader's convenience, and accompanied by an indication of the corresponding rightmost contexts or terminations).

In the first schema from the top, the 1ST SINGULAR and 3RD PLUR-

AL persons are clustered together, while all remaining slots forming a class of their own. The phonological contexts of the two classes can be characterised quite simply in terms of the feature BACK of the initial vowel of an ensuing termination. The second distributed schema of Table 83 (middle row) can equally well be described in phonological terms, since the partition class associated with S_2 groups all and only rhototonic forms.

Table 83

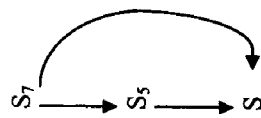
	PRESENT INDICATIVE				
	SINGULAR	PLURAL			
1	2	3	1	2	3
-o	-i	-a, -e	-jamo	-ate, -ite	-ano, -ono
S_2	S	S	S	S	S_2
S_2	S_2	S_2	S	S	S_2
S_2	S	S	S_2	S	S_2

The third distribution schema (bottom row in Table 83) is less easily amenable to a phonological characterisation, thus showing that partition classes do not always group phonologically consistent contexts. This state of affairs brings us naturally to the question: what happens when paradigmatic and phonological criteria do not meet? To answer this, we have to turn back to the phonological analysis sketched out in section 4.1 above, to consider it in the context of the distribution schema of each partial paradigm.

4.2.4.1. Past participle

As we saw in section 4.2.3 (Table 82), a PAST PARTICIPLE stem root can be re-indexed in any of the following ways:

Table 84



This means that the PAST PARTICIPLE can either exhibit a stem root of its own (S_7), or the PASSATO REMOTO one (S_5), or a default S for regular PAST PARTICIPLES (i.e. those ending in [ato, uto, ito]). In the paradigm of some C2 verbs, the distribution of alternating stem roots seems to correlate with the phonological opposition ± BACK in the following vowel: this is true, for example, of those verbs whose stem root palatalises before a front vowel. But default indexing of the PAST PARTICIPLE slot appears to clash with phonological criteria. By these criteria, the PAST PARTICIPLE ending [uto] should cluster with other terminations beginning with a back vowel, the prediction being that the same BS show up in all slots of the cluster. However, we find [ven'nuto] and not *[ven'guto] (as in ['vengo]), [kono]'juto] and not *[kono'skuto] (as in [ko'nosko]) etc. Appeal to an underlying /konos'keto/ solves the phonological problem only at the considerably high price of resorting to a marked phonological rule, which has to be constrained so as to apply i) to a specific grammatical form (the thematic vowel) ii) in a specific morphological environment (the PAST PARTICIPLE slot) iii) in all possible cases (some sort of absolute neutralisation, there being no surface true case of regular PAST PARTICIPLE in [eto]). Paradigmatic indexing is thus only apparently got around. In fact, it has to be invoked as a factor *conditioning* rule application.

Another interesting mismatch between syntagmatic and paradigmatic criteria is provided by a form such as [vis'suto], the past participle of VIVERE 'live'. This exhibits the same stem S_5 of some PASSATO REMOTO forms ([v'issì], 'I lived'), but the phonological context in which S_5 occurs in the PAST PARTICIPLE is considerably different from the phonological context required by the PASSATO REMOTO forms (where [v'iss] is always stressed and followed by a front vowel in every case).

4.2.4.2. Present subjunctive

Let us mention at the outset the systematic paradigmatic relationship between PRESENT INDICATIVE and PRESENT SUBJUNCTIVE forms in Modern Spanish conjugation, first observed by Bybee and Pardo (1981) and phrased by Spencer (1988) as follows:

"Both regular and irregular verbs all have the same athematic root in first singular present indicative and in the present subjunctive paradigm" (p. 9)

In the light of Italian evidence, Bybee and Pardo's generalisation is to be qualified. Not all PRESENT SUBJUNCTIVE slots take over the stem root (our equivalent to Spencer's "athematic root") of the PRE-

SENT INDICATIVE 1ST PERSON SINGULAR. Recall the two distribution schemata of the PRESENT SUBJUNCTIVE partial paradigm, repeated below for convenience:

Table 85

PRESENT SUBJUNCTIVE			
SINGULAR		PLURAL	
1	2	3	1
S ₂	S ₂	S ₂	S
S ₂	S ₂	S ₂	S ₄
			S ₄
			S ₂
			S ₂

Note that, unlike Spanish data, Italian PRESENT SUBJUNCTIVE alternating stem roots do not show up in contexts which overtly contradict phonological predictions (barred solecisms such as ?[vengino] to which we will return in a while). Still we can make appeal to equally compelling indirect evidence in support of the hypothesis of paradigm indexing playing a prominent role in accounting for this systematic relationship.

First, Bybee and Pardo's generalization, in its modified version, has only two absolute exceptions in Italian, namely *AVERE* 'have' and *SAPERE* 'know', where the index *S*₄ spreads over the entire PRESENT SUBJUNCTIVE. It holds true with highly suppletive stem alternates as well, as in the case of *ANDARE* 'go' and *FARE* 'do, make', whose PRESENT SUBJUNCTIVE alternants, namely [vad] and [fat/t/], are entirely predicted in the light of the corresponding PRESENT INDICATIVE forms [vado] '(I) go' and [fat/t/o] '(I) do'. Moreover, the paradigmatic nature of Bybee and Pardo's generalisation receives further support in Italian from two more pieces of purely distributional evidence: 1) reduction in the number of PRESENT SUBJUNCTIVE *BS*s always presupposes a parallel reduction in the number of PRESENT INDICATIVE *BS*s (as predicted by *STH*); 2) the existence of doublets in the 1ST PERSON SINGULAR of the PRESENT INDICATIVE paradigm always entails existence of doublets in the PRESENT SUBJUNCTIVE slots which belong to the same partition class. This is, for example, the case of [dɛbba, 'dɛval], doublets of the 1ST PERSON SINGULAR of the PRESENT SUBJUNCTIVE of *DOVERE*, corresponding to the paradigmatically homologous [dɛbbo, 'dɛvo] in the PRESENT INDICATIVE. Point 2) is particularly interesting, since doublets are often phonologically unrelated. It follows that a systematic regularity in their distribution calls for a generalisation which goes beyond surface-true phonological evidence.

Unlike Spanish, clashes between phonological and paradigmatic evidence occur, in Italian, only in cases of erroneous regularisation of inflectional endings beginning with [a] into those beginning with [i]. It is natural to expect such an alteration of the phonological context to trigger a series of phonological processes. The evidence of mistakes of this sort in our possession, however somewhat anecdotal, points in a different direction: Bybee and Pardo's generalisation overrides whatever phonological criterion one might wish to appeal to (see also Harris 1968). Cases like ?[fat/t/i] for [fat/t/a], ?[vengino] for [vengano], ?[kreskino] for [kreskano] and ?[vadino] for [vadano] show unquestionably the operational pressure of paradigmatic coindexing at the level of the speaker's competence.

4.2.4.3. Present indicative

Present indicative forms of [isk]-verbs do not exhibit an overt contrast of paradigmatic indexing and phonological criteria. Still, we believe that the distribution of the [isk] augment is worth mentioning in this context since it parallels other forms of paradigmatic indexing, as shown below by *FINIRE* ('end') and *TENERE* ('hold').

Table 86

PRESENT INDICATIVE OF <i>FINIRE</i> AND <i>TENERE</i>					
SINGULAR			PLURAL		
1	2	3	1	2	3
fɪ'nisko	fɪ'niʃi	fɪ'niʃje	fɪ'njamo	fɪ'nite	fɪ'niskono
'tengo	'tjɛni	'tjɛne	te'njamo	te'nete	'tengono
S ₂	S ₃	S ₃	S	S	S ₂

An interesting clash between morphological and phonological requirements is exemplified by the pair [paʃamo, appa'ɾjamo] '(we) seem, (we) appear', relative to the lexemes *PARERE* and *APPARERE*. Both verbs undergo r-drop in the 1ST PERSON SINGULAR and 3RD PERSON PLURAL of PRESENT INDICATIVE (respectively [paʃo, paʃono] and [appa'ɾjo, appa'ɾjono]). However, they eventually exhibit a different indexing: *APPARERE* shows a default *S* in the 1ST PERSON PLURAL, where *PARERE* has *S*₂. This is impossible to explain phonologically. Paradigmatically, it represents the outcome of a process of reduction in the number of *BS*s, with a resulting transition to a more widely attested PRESENT INDICATIVE paradigm with two *BS*s (section 3.1.1).

Another phonological inconsistency is found in the form

[nʷɔtʰo] '(I) harm'. Here we have consonant lengthening combined with diphthongization. The two processes must be ordered extrinsically, since consonant lengthening would bleed application of diphthongization (stressed open syllable). However, the *PASSATO REMOTO* [nʷɔkwɪ] '(I) harmed' seems to require the reverse ordering. Once more a phonological account has to rely on a form of paradigmatic conditioning of rule ordering.

4.2.4.4. *Future indicative*

All future forms of *SEDERE* are not justified phonologically (see Table 67 above). Contrary to phonological evidence, diphthongization here takes place in an unstressed environment (see [sʲɛdo, se'dete] '(I) sit, you sit'). Still, this data squares with paradigmatic indexing, as the *FUTURE INDICATIVE* carves out a partition class of its own (also shared by *PRESENT CONDITIONAL*).

4.2.4.5. *Passato remoto*

A lexically-conditioned phonological account of consonant lengthening and diphthongization would clash with the paradigmatic distribution of *PASSATO REMOTO* irregular forms. Consider a pair like [tʲɛni, 'tɛnni] '(you) hold, (I) held'. Here, the same phonological context (ensuing [i]) affects the underlying stem root in two highly different ways. In fact, it is completely immaterial here which form is taken as underlying (i.e. either /tɛn/ or /tɛng/). The fact of the matter is that it is simply not sufficient to mark the entry of *TENERE* as undergoing diphthongization, lengthening or velar deletion, unless these processes are also constrained so as to apply in specific partition classes of the paradigm. Ultimately, phonological processes do not dispense with the need for assuming the existence of grammatically relevant partition classes. A pair like [mɔssi, mɔ'vesti] '(I) moved, (you) moved' (together with other verbs such as *CUOCERE* and *SCUOTERE*) tells a similar story. *MUOVERE* undergoes diphthongization, but the rule applies to all open syllables, no matter whether they are stressed or not. Again, this contravenes phonological reality, but it is perfectly compatible with paradigmatic indexing. As expected, we find a diphthong in all slots taken by *S*: [mɔ'vete, mɔ'vɛvo, mɔ'vessi] etc.

4.2.5. *Conclusion*

Besides clear cases of suppletion and application of low level phonological processes, Italian alternating stem roots are, in the vast

majority of cases, formally related through phonological rules which are no longer productive (minor rules). It is a widely acknowledged fact that the range of application of these rules is to a large extent governed morphologically. We also observed that they happen to apply in some partition classes of a paradigm but not in others. Although this is partly explained by the fact that most partition classes group phonologically coherent contexts, there are, in our view, several good reasons to claim that such classes have in fact a fully paradigmatic status. First, they cluster alternating stem roots which appear to meet all Aronoff's criterial properties for basic stemhood (see section 2.1.1): they do not correlate systematically with specific arrays of morphosyntactic features (they are not meaningful, condition a.); their distribution is indeed intraparadigmatically systematic (owing to *ODS*, condition b.); their output is not phonologically predictable (as shown in this section, condition c.). Furthermore and more significantly for the present concerns, they appear to shed considerable light on the data overviewed here:

- 1) they explain underapplication of phonological rules (?[vɛngino]);
- 2) they explain overapplication of phonological rules ([kre]/'jutol, [sʲɛde'rɔ] [mɔ'veste]);
- 3) they account for the distribution of suppletive stems ([mɔssi, 'mɔssol]);
- 4) they account for the distribution of doublets ([dɛbba, 'deval]);
- 5) they account for any combination of the above mentioned facts.

A good example of 5) is given by the *PAST PARTICIPLE* form [vis'su-to] 'lived', where a suppletive *S_p*, whose distribution is governed by an accentual pattern in the *PASSATO REMOTO* paradigm, has a purely paradigmatic justification in the *PAST PARTICIPLE*, where the *PASSATO REMOTO* stress pattern is violated.

To sum up, a truly paradigmatic view of the data of Italian conjugation has the nonnegligible advantage of providing a unitary, coherent account of what would otherwise look like a core of predictable phonological processes submerged by a motley variety of relevantly unrelated exceptions. A further interesting confirmation of the validity of this approach, and one which we will only cursorily mention in this paper, is the fact that the distribution of all cases of phonologically unpredictable allomorphy of inflectional ending in Italian correlate with unpredictable stem functions: in particular, they are found in any partition class but the one associated with default *S*. Finally, it should be observed that this perspective simplifies considerably the learning problem.

This conclusion is in accordance with similar conclusions arrived at in the framework of Natural Generative Phonology (Hooper 1976, 1979) in denying a full phonological status to minor phonological rules. However, it does not automatically endorse any specific model of how alternating stem roots should be dealt with in the grammar. Arguably, given the data presented here, and the fact that they can hardly be described in terms of a purely syntagmatic approach, morphological phonology (Hudson 1974, Lieber 1981, Spencer 1988, 1991, Stump 1991, Brown et al. 1996) suggests itself to the linguist as a *prima facie* natural candidate model. In effect, what one seems to require for the data presented here to be appropriately described is just to split the generative rewriting rule into two parts, the phonological change induced by the rule (accounting for stem alternation), and the context of application (accounting for stem distribution). Morphological rules of some kind could well serve the purpose of capturing formal redundancies at this level (e.g. between ['tengo, 'tjɛni] and ['vengo, 'vjɛni]) by deriving all predictable alternants from a possibly underspecified base. On the other hand, indexing schemata can safely be used to capture the contextual dimension of the distribution of the obtained alternants.

Although it is certainly true that a morphological solution is weakly equivalent to the generative rewriting model, it is not obvious that the former could also match the explanatory power of the latter (Spencer 1991). At the root of the classical generative account lies the assumption that phonological changes are induced by context, and this is credited for explaining why stem roots exhibit a specific, phonologically constrained range of alternations. Morphological rules do not seem to be equally constrained. Wanner (1972) entertains the hypothesis that clearly phonological processes be constrained paradigmatically. By updating Wanner's suggestion to our present theoretical framework, one could use morphological rules for capturing cases of stem suppletion only, whose distribution can be further stipulated through an indexing schema. Non automatic, phonological alternants would then be taken care of through paradigmatically conditioned (minor) phonological rules as illustrated by the following example.

The Italian verb *CRESCERE* 'grow' undergoes velar palatalization in all front vowel environments, with the exception of the PAST PARTICIPLE slot, where palatalization takes place in what is an overtly bleeding phonological environment: [kref/'juto] instead of expected * [kres/'kuto]. Moreover, *CRESCERE* exhibits a further alternant

(['krebβ]) in some slots of the PASSATO REMOTO (S_5 in *ODS*). We assume that, after application of some morphological rules and indexing schemata, the phonological portion of the lexical entry of *CRESCERE* would look like this (following Hudson 1974 and Spencer 1988b):

$$\left\{ \begin{array}{l} \text{['krebβ]} \mapsto S_5 \\ \text{[kresk]} \cdot \text{VP} \mapsto \text{elsewhere} \end{array} \right\}$$

The entry already takes care of two of the three *BSs* of *CRESCERE*, by indexing them appropriately ("→" means "is assigned S_i "). As to the remaining third alternant ([kref/'j]), we can further assume that a velar palatalization rule²⁰ is at work, stated as follows:

Table 87. Rule for Velar Palatalization

$$\left[\begin{array}{c} \text{[k]} \\ \text{[g]} \end{array} \right] \rightarrow \left[\begin{array}{c} \text{[tʃ]} \\ \text{[dʒ]} \end{array} \right] / \left[\begin{array}{c} \text{---} \\ \text{---} \\ \text{---} \end{array} \left[\begin{array}{c} \text{[i, e, u, j]} \\ \text{---} \\ \text{---} \end{array} \right] \right]_{-S_2}$$

Velar palatalization is a minor rule, meaning that it can apply to those *BSs* only which are specified as '+VP' in the lexicon. The rule is required to interact with *ODS* in the following way: it applies in all possible triggering environments, provided that they are not found in a slot marked as S_2 . This is conveyed by the '- S_2 ' diacritic in the context part of the rule. This is useful to account for cases of underapplication of palatalization in the PRESENT SUBJUNCTIVE slots, as in erroneous overregularizations such as ?['kreskino] '(that) we grow'. In fact, injection of a paradigmatic diacritic in the context part of Velar Palatalization rule is not very enlightening: it does not make any direct contact with *ODS*, and hence requires that the same '- S_2 ' be marked in the context part of any other minor phonological rule facing the same inconsistency (e.g. diphthongization of mid vowels in open syllables, compare the over-regularization ?['vɛnino] with unattested *['vjɛnino]). In fact, the use of paradigmatic diacritics in the body of a phonological rule could be avoided by resorting to lexical indexing and a general blocking condition on rule application. Suppose that the phonological portion of the entry of *CRESCERE* is as follows:

$$\left\{ \begin{array}{l} \text{['krebβ]} \mapsto S_5 \\ \text{[kresk]} \cdot \text{VP} \left\{ \begin{array}{l} \mapsto S_2 \\ \mapsto \text{elsewhere} \end{array} \right. \end{array} \right\}$$

The stem root [kresk] is assigned the index S_2 through lexical stipulation. Again, 'elsewhere' signifies that it can also act as a default stem. The two contexts hold disjunctively, as indicated by their being between curly brackets. On the other hand ['kreibb] is assigned S_5 , the partition class of *PASSATO REMOTO*. We can now formulate the following principle of paradigmatic lexical blocking of rule application:

if a stem S in a lexical entry is explicitly associated with a certain index I , no minor phonological rule can apply to S in the paradigmatic slots which are marked by I in *ODS*

Given this principle and the revised lexical entry of *CRESCERE*, [kresk] would skip velar palatalization in all slots marked in *ODS* as S_2 .

What is important to emphasise at this point is that addition of [u] in the triggering environment for velar palatalization (Table 87) accounts for the attested form [kre/'juto] 'grown' in the *PAST PARTICIPLE*. The move is admittedly unnatural phonologically. Alternatively, one can resort to the hypothesis of an underlying /kres'keto/, with successive application of palatalization and conversion of the thematic vowel into [u]. As already pointed out above (section 4.1.2), this solution strikes us as equally unnatural. However, there are admittedly no other viable alternatives in the spirit of Wanner's proposal. Overapplication of phonological processes induced by *ODS* poses in fact a serious challenge to the phonological treatment of cases of paradigmatic levelling involving a default stem which does not coincide with the alleged phonological underlying form. The moral of this story is that paradigmatic conditioning of phonological processes is an interesting way to capture aspects of the interaction between *ODS* and phonological reality. Still it falls short of providing an entirely satisfactory account of all data, since, in Italian, *clashes between ODS and phonological principles are always systematically solved in favour of ODS*. This observational inadequacy is not incurred by morphological treatments, whereby stem indexing can directly be enforced in the lexicon, in spite of their failure to acknowledge the relationship between *ODS* and phonological principles in the grammar.

Another interesting issue here is whether processes of stem formation and indexing schemata exhibit any sort of mutual correlation, so that, for example, evidence of a certain phonological process of stem formation can be used as a predictor of a certain partition class. We already showed that the reverse implication is trivially not true

in Italian conjugation (see, for example, the variety of phonological processes attested in the *PASSATO REMOTO* distribution schema of section 3.4). Stump (1995) considers in some detail data from Sanskrit, to arrive at the formulation of the following Indexing Autonomy Hypothesis (*IAH*):

"Stem pairs exhibiting an identical contrast in formation needn't exhibit an identical contrast in indexing"

IAH is also supported by Italian data. To give but one example, the formal alternation [tt] → [ss] governing the phonological relation between the verb forms ['metti, 'messi] '(you) put, put (PAST PARTICIPLE)' and ['fritti, 'frissi] 'fried (PAST PARTICIPLE), (I) fried' correlates, in the two cases, with two completely different partition classes. ['metti, 'messi] are respectively the 2ND PERSON SINGULAR of the PRESENT INDICATIVE and the MASCULINE PLURAL of the PAST PARTICIPLE of *METTERE*, while ['fritti, 'frissi] are respectively the MASCULINE PLURAL of the PAST PARTICIPLE and the 1ST PERSON SINGULAR of the *PASSATO REMOTO* of *FRIGGERE* (see indexing schema below).

Table 88

Stump's IAH	
<i>FRIGGERE</i>	
'fritti	↔ S_7
'frissi	↔ S_6
<i>METTERE</i>	
'metti	↔ S
'messi	↔ S_7

IAH represents a sort of baseline hypothesis: it can be proved true if one can show the existence of at least one pair of examples where a phonological parallelism is not accompanied by the same indexing schema. More can be said on this than *IAH* entails and space allows here (see for example Battista and Pirrelli 1996).

5. Final remarks

In this paper we carried out a detailed analysis of Italian Conjugation from two different perspectives, phonological and para-

digmatic. In principle, one would expect these two complementary viewpoints to take care of neatly separable classes of data: phonologically-related alternants should distribute in phonologically-coherent contexts; morphological alternants should by definition distribute morphologically. In fact, the two domains happen to be interlocked in a complex way. Barred synchronically productive low level phonological rules, there appears to be a grammatical continuum, ranging from minor phonological processes to clear suppletion, which can be partitioned in the following way:

- 1) verb stems undergoing phonological processes which nonetheless distribute paradigmatically, in compliance with ODS: example CONOSCERE.
- 2) verb stems undergoing suppletion, whose distribution, apparently syntagmatic, in fact complies with ODS: example MUOVERE.
- 3) verb stems undergoing suppletion, whose distribution is purely paradigmatic (ODS): example PIACERE.

We showed that *this grammatical continuum is entirely governed by ODS*. What looks like a phonological exception, calling for complex assumptions concerning both underlying representation and rule ordering, turns out to be in fact, from the standpoint of ODS, the paradigmatically-unmarked option. Moreover, suppletive or nearly suppletive stem functions are not randomly associated with paradigmatic slots. Rather, they appear to distribute according to a grammatical gradation, a relatively well-behaved continuum from more to less regular cases of stem alternation, where the diachronic notion of paradigm levelling is reinterpreted synchronically as a case of BS reindexing.

Interestingly enough, in a paradigmatic perspective, a highly irregular paradigm does not lie outside of the grammatical domain, but it rather defines the limits of *grammaticality*. We show that *STH*, compounded with knowledge about default re-indexing, makes it possible to predict number and distribution schema of irregular paradigms with - say - three BSs from the number and distribution schema of irregular paradigms with four BSs. Besides, ODS can make predictions on the distribution of doublets, which, far from retaining their classical status of fastidious accidents in verb inflection, appear in fact to show a predictable paradigm-driven distribution. From this perspective, if *STH* turns out to be valid across languages, then it will be a natural complement to Carstairs' Paradigm Economy Principle (1987), maximally constraining the descriptive

luxury of which paradigms are often purported to avail themselves. In Italian Conjugation, this is confirmed by the observation that all unpredictable allomorphs of inflectional endings keep company with unpredictable stem functions, that is they appear to be distributed in partition classes other than default *S*. Finally, the fact that exactly the same predictions holding true for this class of paradigmatic phenomena also prove to obtain in cases of stem alternation governed by minor phonological rules, is good reason for us to believe that the paradigmatic analysis offered here attained a significant level of generalisation. The major contribution of this paper lies, we contend, in this striking battery of complex constraints, rather than in the relatively minor issue of how many basic stem types are attested in Italian conjugation, the final number of which can vary depending on how many exceptions one is ready to make allowances for, as shown by the work of Dressler and Thornton (1991) and Vogel (1994).

A phonological account has comparatively little to offer to match such a sweeping account of apparently unrelated data. Still, the state of affairs described in 1)-3) above strikes us, to an extent, as paradoxical. As illustrated in the diagram of Table 89 below, verbs like CONOSCERE and MUOVERE appear to be, contrary to common wisdom, cross-classified relative to the paradigmatic/syntagmatic divide.

Table 89

	PARADIGMATIC	SYNTAGMATIC
STEM FUNCTION	PIACERE, MUOVERE	RISCHIARE, CONOSCERE
STEM INDEXING	PIACERE, CONOSCERE	RISCHIARE, MUOVERE

Cross-classification is unexpected, unless one assumes that the syntagmatic and paradigmatic dimensions of allomorphy do indeed interact somehow. Nonetheless, we showed that a completely satisfactory account of this interaction eludes currently available models of grammar.

Actually, it can be argued that we have been looking for this interaction in the wrong place, the two dimensions being related through diachrony rather than synchronically. In a nutshell, paradigmatic partition classes could be looked at as remnants of originally phonologically-motivated processes, which eventually lost their phonological transparency and were reinterpreted paradigmatically. This is not to be confused with *morphologization* of an originally phonological process, as modelled in the classical analysis of Natural Morphology (a recent discussion of which can be found in Dressler

1996). In fact we contend that no gain in morphological indexicality must be assumed to have taken place here at the expenses of phonological indexicality; in theory, paradigm extension of phonological processes can predate loss of phonological motivation (the former being possibly the cause rather than the effect of the latter), although this, in our view of things, is not *per se* an unmistakable sign of *interactivity* between phonology and morphology (as suggested in Maiden 1991). If this proposal is right, it should be of use in investigating historical change together with other more established mechanisms. It will shed light, in particular, on the difficulty of describing data of Italian conjugation on a strictly syntagmatic basis. Cases of analogy-based formation due to the pressure of paradigmatic proportions (or paradigm levelling) can thus be of avail to explain, for example, non etymological insertion of [g] in 1ST PERSON SINGULAR of VENIRE ['vengo], from Latin *veneo*, by analogy to the paradigmatically homologous form ['dzungo], from Latin *iungo* (as suggested by Rohlfs (1966) and Tekav (1980)).²¹ If analogy-based formation is taken on board, then the phonological inconsistency of analogised data should come as no surprise. This idea retains a psycholinguistic plausibility. Paradigm-driven inflectional errors in spoken Italian, while flying in the face of overt phonological evidence, appears to suggest that principles of paradigmatic organisation are in fact part and parcel of the speaker's competence: they represent synchronically operative grammatical forces, which also appear to simplify the language learning problem to a considerable extent.

Address of the authors

Istituto di Linguistica Computazionale, Consiglio Nazionale delle Ricerche, Area della Ricerca di Pisa, Località S. Cataldo, v. Moruzzi 1, 56100 Pisa, Italy

Notes

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for pointing out errors and providing encouragement, and to two anonymous reviewers for their constructive comments. Remaining errors are our own.

¹ By convention, a word form will be written in italics, and its corresponding lexeme in small capitals. We will also use small capitals for morphosyntactic features.

² In the remainder of the paper we will mainly be concerned with verb forms in the active voice. We will hence omit indication of voice hereafter, unless required by the context.

³ The Italian conjugation system is traditionally articulated into three conjugation classes, referred to as *first Conjugation* (C1), by far the most regular one, gathering all verbs with an [a] theme vowel, *second Conjugation* (C2), thematic vowel [e], and *third Conjugation* (C3), thematic vowel [i] (but see Napoli and Vogel 1990, and Dressler and Thornton 1991 for alternative analyses).

⁴ A similar claim, albeit cast in a different theoretical framework, is made by Kiparsky (1996).

⁵ There have been attempts to salvage *PI* from the existence of doublets by claiming that no doublets are freely interchangeable in context, use of either form hinging on either i) lexico-semantic differences, as in the case of *riflesso* 'reflected' in contexts such as 'the light was reflected off' and *riflettuto* in the sense of 'thought over', or ii) different pragmatic/stylistic uses.

⁶ The theme vowel *ō* is characteristic of all Latin 2nd declension nouns, where it is overtly realised in some slots only (e.g. DATIVE and ABLATIVE SINGULAR *lupō* ACCUSATIVE PLURAL *lupōs* and GENITIVE PLURAL *lupōrum*). It alternates with a in all four-way Latin adjectives, together with past and future participles.

⁷ In fact this statement should be qualified as holding for Latin verbs of the *-ā* and *-ē* conjugations. For other conjugations, while the IMPERFECT is formed on this stem, the FUTURE is formed with the vowel *e* attached to the PRESENT stem.

⁸ The across-the-board formal predictability of the Latin *b*-stem is, incidentally, the very reason why IMPERFECT or FUTURE verb forms are never listed as *exponent forms* within the verb entry of a traditional Latin lexicon, where one usually finds the PRESENT INDICATIVE 1ST PERSON SINGULAR, the PERFECT INDICATIVE 1ST PERSON SINGULAR, the SUPINE and the PRESENT INFINITIVE. The last form does not call for a distinct basic stem, but serves the purpose of giving information about the conjugation class of the verb in question. All other exponent forms are exactly built upon Aronoff's basic stem types. The idea here is that all outstanding verb forms can be derived from the exponent forms listed in the lexicon, once the appropriate conjugation class is inferred from the INFINITIVE.

⁹ Incidentally, the paradigm of SUM provides evidence for establishing a fourth basic stem type in Latin, namely what Aronoff calls the *b*-stem, due to the distribution of the stem *er-* in both the IMPERFECT (*er-am*) and the FUTURE (*er-o*) INDICATIVE ACTIVE.

¹⁰ Note that the *surface realisation* of a theme vowel can also be conditioned phonologically, as observed by Scalise (1984, 1994): to our knowledge, however, in Latin and Italian it is never the case that a particular theme vowel (say *a* instead of *e*) is selected for phonological reasons.

¹¹ Generally speaking, a stem root associated with any *S_i* can possibly undergo a phonological readjustment as a result of either of the following facts: i) *S_i* is input to a further stem formation rule (as in the case of [assunto] in Table 5) or ii) *S_i* is trailed after by a termination triggering a particular phonological change (as in the case of Italian [riski] mentioned in section 2.2, and illustrated in Table 10 below).

¹² A notable exception is the verb SUM 'be' and its derivatives.

¹³ This evidence is compatible with the *diachronic drift towards a simplification*

of the Italian inflectional system suggested by Dressler and Thornton (1991) if one appreciates that the focus of their analysis is almost exclusively centred on highly productive verb classes. In this respect, our inquiry complements, rather than contrasts with, Dressler and Thornton's conclusions, as we emphasise aspects of speaker's competence which, however only mildly productive, shed considerable light on the way the brain appears to relate linguistic form and function (we are grateful to one of the anonymous reviewers for suggesting this point).

¹⁴ In fact, this alternation exhibits diphthongization of the stem vowel (but the variants [movesti, movemmo, moveste] are also attested); we will return to this phenomenon in section 4.1.5 of the paper.

¹⁵ Note that some of these stems can only be inflected in derived environments, with an accompanying prefix. For example, the verb stem *DURRE is found in verbs such as INDURRE 'induce', CONDURRE 'drive, lead', RIDURRE 'reduce', but never in isolation. In the list, stems of this type are marked with an asterisk, and no English gloss is provided as to their meaning.

¹⁶ It should be appreciated at this stage that indexing schemata are not to be interpreted as being as such part of the linguistic competence of a speaker, as the number of schemata memorised by learners can vary depending on a) random differences in the order and frequency of the type of acquired evidence, and b) trade-off solutions between settling on an optimal classification strategy (whereby all attested schemata are learned) and choosing a suboptimal and less costly strategy which requires fewer parameters (i.e. fewer schemata to be acquired). The reason why we are considering all possible such schemata here, is because we are interested in probing the *entire space* of admissible formal variation, while neglecting the orthogonal issue of the degree of productivity of this variation.

¹⁷ The same point holds for the forms ['tɛni, 'tɛnne] '(I) held, (you) held' as opposed to ['tjɛni, 'tjɛne] '(I) hold, (you) hold', or ['vɛnni, 'vɛnne] '(I) came, (you) came' as opposed to ['vjɛni, 'vjɛne] '(I) come, (you) come'.

¹⁸ But note the existence of the form [appa'rjamo] '(we) appear', on which more in section 4.2.4.3.

¹⁹ In fact, there is one single exception to PFCP in Italian Conjugation, namely the past participle *visuto*, about which more below (section 4.2.4.1).

²⁰ The rule accounts for only part of the derivation: namely *eres*[k] -> *eres*[ʃ]. For simplicity, the other steps are not considered here as they are immaterial to the argument developed here.

²¹ Other interesting examples of related phenomena are found in Andersen (1972), Lazzeroni (1989) and Maiden (1995b) among others.

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