

VOCALIC MODIFICATIONS  
IN THE ITALIAN FUTURE AND CONDITIONAL

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1. Within any given language, there may generally be found a number of phonological and morphological alternations. Some alternations stand as clear reflections of general phonotactic processes; for example, the homorganic assimilation of nasals to a following obstruent, occurring in Spanish, Italian, and other languages. Other alternations, while synchronically perhaps rather anomalous, represent the results of previously occurring phonological processes; for instance, the loss of stem-final *l* and *n* during pluralization in Portuguese, mirroring an earlier process by means of which intervocalic *l* and *n* were lost. Still other alternations are morphological in nature, and while serving as part of the automatic language competence of the speakers, seem to reveal no logical basis, phonotactic or phonological. One apparent example of the latter sort of alternation is offered by the formation of the future and conditional tenses of Italian verbs of the first conjugation. In these tenses, the thematic vowel, normally *a*, becomes automatically shifted to *e*, while all other forms either preserve the stem-final *a* or replace it with a morphological suffix. By way of illustration, the following typical paradigm, representing the verb *parlare*, is reproduced below:

<i>future</i>	<i>conditional</i>
parlerò	parlerei
parlerai	parleresti
parlerà	parlerebbe
parleremo	parleremmo
parlerete	parlereste
parleranno	parlerebbero

In the remaining two Italian conjugations, ending in *-ere* and in *-ire*, the thematic vowel does not become altered in the future and conditional, although it sometimes disappears due to the action of an earlier process of syncope. Alternations of the sort exemplified above have traditionally been noted by Italian grammarians and philologists,

but no systematic attempt at accounting for them has ever been offered, although a number of partial suggestions are scattered throughout the literature. In the present undertaking, an effort is made to cut through the confusing and sketchy data surrounding this problem, in order to trace the possible origin and development of this series of vocalic alternations. The tentative results which may be established on the basis of such an investigation seem to bear directly on the problem of diachronic phonological strength hierarchies, an area representing the intersection between traditional methods of historical linguistics and modern phonological theory. It is not the intent of this investigation to offer any definitive pronouncements regarding the rôle of formal hierarchies in historical descriptions; rather, the following remarks must be regarded as merely suggestive of possible areas of relevance to the study of diachronic processes. In order to visualize the conclusions, it is first necessary to clear away several obstacles in order to get a clear view of the primary data from which theoretical speculations may be extracted. The path toward such a view is tortuous at best, full of false turns and hidden obstacles; it is hoped, however, that the eventual results, while by no means completely conclusive, at least converge in the direction of an acceptable account of the events under discussion.

In the ensuing investigation, it is imperative to keep in mind the question of cause and effect in historical linguistics, in order to forestall any misunderstandings that might arise on the basis of the theoretical interpretations to be offered. What is sought after in this study is not the actual motivation for a given sound change, but rather the factors that shaped its eventual evolution, since these are generally the only factors which are available for empirical investigation. The question of *why* a given sound change took place should be evaluated in the light of the following remarks of Wittgenstein, taken from *The Brown Book*:

If you ask 'why', do you ask for the cause or for the reason? If for the cause, it is easy enough to think up a physiological or psychological hypothesis which explains this choice under the given conditions. It is the task of the experimental sciences to test such hypotheses. If on the other hand you ask for a reason the answer is 'There need not have been a reason for the choice. A reason is a step preceding the step of the choice. But why should every step be preceded by another one?'

This advice from a (scientifically trained) philosopher is particularly appropriate to the study of language change, for it illustrates the boundaries which the investigator must draw for himself in order to achieve meaningful results. Historical linguistics can be pursued apart from considerations of philosophy and individual psychology, but only if the linguist does not overstep the boundaries delimiting the scope of enquiry. The following remarks, it must be reiterated, embody the search for the formal structures in language which are *conducive* to sound change; due to the confusing terminology which has arisen concerning 'explanation' in linguistics, this notion must be kept distinct from the search for the *reasons* behind sound change, a search which plays no rôle in the present investigation.

2. As a preliminary observation, it should be pointed out that the shift of *a* to *e* in the future and conditional apparently had its origin in the Tuscan dialect, spoken in and

around Florence;<sup>1</sup> even today there are many local Italian dialects in which this change was not effected, and some in fact in which the opposite change of *e* to *a* took place. The date of this shift within the Tuscan dialect is impossible to determine, since it appears to have coincided with, or even preceded, the transition from Latin to Italian as the literary standard. Migliorini (1963: 140) gives an example of one of the earliest attestations of the vocalic alternation in a document dating from about 1250, in which the form *manderò* (from *mandare*) is found alongside remnants of the Latin synthetic future, such as *dirabo* (from *dire*). Other Tuscan writers of the same period also show similar tendencies in their works. For example, in *Il Libro dei Vizi e delle Virtudi* (1272) by the Florentine Bono Gamboni, the change is already in progress; in Chapter Six, for example, we find *porterete* (from *portare*) and *lamentereite* (from *lamentare*). In Chapter Eight, we find *durerà* from *durare*, in Chapter Eleven, *consiglièrò*, from *consigliare*, and so forth, alongside numerous forms in which the thematic vowel *a* has remained unaltered in the future and conditional.

In the *Istoria Fiorentina* of Ricordano Malispini, dating from approximately the same period, the forms *tornerebbono* (from *tornare*; note the archaic conditional form) and *manderò* (from *mandare*) are found. Similarly, in Ristoro D'Arezzo's *La Composizione del Mondo* (1282), forms in which the theme vowel *a* has remained unchanged predominate over those with a modified theme vowel; this may be in part due to the fact the author was not from Florence, but from Arezzo, a short distance to the south.

A century later, the change of *a* to *e* has become firmly implanted in Dante's *Divina Commedia*, where, however, one example of the change in progress is provided by an unscopated future form of *andare* in the *Paradiso* (Canto 30, line 144): *Non anderà con lui per un cammino*. Here the *a* has been raised to *e* but not yet syncopated. That some variation still existed during this period is also suggested by the appearance of the older forms in *a* in the work of some of Dante's contemporaries. For example, in Boccaccio's *Decameron*, we find (*Giornata seconda, novella decima*) the line: *Tosto ella mi si gittarà incontenente al collo*; only a few lines later, however, we encounter such phrases as *voi mi perdonerete, qual donna canterà*, etc. In the *Rime* of Petrarch, we also encounter (No. 28, line 36) the line: *Con Aragon lassarà vota Ispagna*.

In the first actual Italian grammar, the *Grammaticetta Vaticana* of Alberti, written towards the end of the 15th century the change of *a* to *e* in the first conjugation future and conditional forms is listed.<sup>2</sup> Bembo's *Prose della Volgar Lingua* of 1512 also states this alternation, although indicating that there are many people even in Florence who still pronounce the *a*.<sup>3</sup> By the 1600's, the Tuscan standard had become the norm for all of cultured Italy; while one still finds forms with the *a* unaltered in the writings of non-Tuscan authors, such a practice was stigmatized by the grammarians.<sup>4</sup>

Once the change had been at least initially implemented in Tuscany, it spread gradually to some of the other Italian dialects. As early as 1374, we find traces of Tuscan

<sup>1</sup> For further discussion, see Izzo (1972: 164).

<sup>2</sup> Taken from the facsimile edition Alberti (1964).

<sup>3</sup> Taken from the edition Bembo (1955: 148).

<sup>4</sup> Cf. the discussion in Migliorini (1963: 471).

influence in the *Rime* of the northern Italian poet Antonio Beccari; for example, in the poem 'Primo che 'l ferro' one finds (line 18) *el non ve mancherà finir questa opra*, while a short time later (line 44), the normal northern pattern appears in the conditional form *bastarebbe*.<sup>5</sup>

By the 14th century, the Tuscan innovations were beginning to leave their trace on manuscripts written in the Roman dialect; however, Ernst (1970: 59) feels that the appearance of *e* for *a* in the future and conditional stem of first conjugation verbs is largely due to the analogical influence of the verbs in *-ere*, which, as noted above, retain the thematic vowel *e* throughout the paradigm. Since Ernst's study was based solely on an examination of documents, one must of course add to his theory of analogy the most likely source of influence; namely the writings of the Tuscan literary figures such as Dante, Boccaccio, and Petrarch.

Returning now to the Tuscan dialect, where according to all available evidence the vocalic alternation originated, one must address the question of precisely why the change occurred in the first place. The attempted answers to this question have been many, although all clustering about a few common themes. Before sorting through the assortment of scholarly opinions, however, one salient point should be brought forward: the shift of the thematic vowel from *a* to *e* in the future and conditional affected all verbs of the first conjugation except *dare*, *stare*, *fare*, and *andare*. In the former three verbs, the thematic vowel remains unaltered in the future and conditional; in the case of *andare*, the thematic vowel is syncopated, yielding *andro*, *andrebbe*, etc., although originally the vowel *a* was modified to *e*, as noted earlier. In addition, the future and conditional forms of *essere* exhibit the stem *sar-*, possibly by analogy with the forms of *stare*. These exceptions must be kept in mind when evaluating the opinions of the various investigators who have dealt with this problem.

3. By far the great majority of authors discussing the events in question have ascribed the shift of *a* to *e* to the 'raising influence' of the following *r*, which occurs in all future and conditional forms. Such an observation logically follows from the fact that each of the verbs under discussion exhibits the alternation *ar* ~ *er*, with *r* being the common factor uniting the variants. Some scholars have been content to merely categorize the before and after effects of the change in a purely descriptive fashion. Thus, d'Ovidio and Meyer-Lübke (1904: 671) remark in passing: 'Vor *r* wird *a* . . . zu *e* bleibt'. Rohlf's (1949: 230) states: 'Was *a* betrifft, so wird dies vor *r* im Florentinischen in der Regel zu *e*'. More prevalent, however, has been the view that the presence of the following *r* in some way required the shift of *a* to *e*. Meyer-Lübke (1890a: 290) stated: 'Von den Sonanten ist *r* der wichtigste . . . vor sich bedingt es *e* im Italienischen'. Bourciez (1967: 485) noted: 'En effet l'*a* lui aussi éprouve devant *r* une fermeture en *e*, soit à la penultième . . . soit devant l'accent'. The same position was also taken by Lausberg (1956: 155):

Wo der Mittelvokal erhalten bleibt, kann er durch die umgebenden Laute verschieden beeinflusst werden. So verlangt das It. vor *r* die Qualität *e*.

<sup>5</sup> The edition of Bellucci (1967: 104) lists other variant forms occurring in the available manuscripts, including *marcherà* and *mancherrà*.

A similar conclusion is also echoed by Battaglia (1970: 169):

La formazione moderna del futuro è perciò assai semplice e chiara . . . Il cambiamento, per la prima coniugazione, di *a* del tema dell'infinito in *e* si deve alla presenza di *r*.

A somewhat more moderate position was suggested by Grandgent (1927: 55–56):

The choice of *e* when *r* follows and *i* elsewhere is probably a phenomenon of association, *e* being in the whole mass of words the commonest intertonic vowel before *r*, *i* the commonest before other consonants. The Siense preference for *a* may show the assimilative power of the first conjugation, or simply the natural tendency of *r* to open a preceding vowel.

These remarks are, of course, largely circular, since the reason for the predominance of *e* before *r* is precisely the fact that *a* was often changed to *e* in this position, and reflects no overriding Latin phonotactic heritage. Scepticism has also been evinced by Pei (1941) who notes the following, in connection with the vocalic alternations in verb stems:

In the first conjugation it is to be noted that this restored or retained vowel is *e* where we should expect *a* . . . a general rule that pretonic *a* tends to become *e* before *r* has been suggested. Before other consonants the change seems to be in the direction of *i*: (*collocare* o . . . *correre*, *obediare* o *ubbidire* . . . (p. 39)

The *e* for *a* in the first conjugation infinitive . . . is somewhat doubtfully accounted for by the fact that it is followed by *r*; an alternative explanation is that *ameró* is analogically influenced by *persuaderó*, *perderó*, and so forth; this is equally doubtful since there are more verbs of the first conjugation than of the second and third conjugations combined. (p. 103)

To these observations must also be added the fact that in the third conjugation, the thematic vowel is *i*, which finds no analogue in verbs of the other two conjugations. Nor have the verbs of the third conjugation ever shown any inclination to fall under the influence of the dominant future-conditional *er* pattern represented initially by the second conjugation verbs and later joined by the verbs of the first conjugation.

4. All the above studies, and others like them which may be sifted from the literature, have inclined toward ascribing to the consonant *r* the potential ability to raise preceding vowels. There exists, however, a far from negligible number of linguists who feel that, to the contrary, the dominant characteristic of *r* is the tendency to lower contiguous vowels. We have already seen Grandgent's speculations with regard to the lowering of *e* in southern Italian dialects. An even more programmatic assertion is offered by Deferrari (1945: 29):

A vowel is sometimes opened when it is adjacent to a variety of *r*. This opening effect of *r* is strongest (most frequent) when the *r* follows the vowel and, at the same time, is followed by another consonant. The opening effect of *r* is less strong (less frequent) when the *r* follows the vowel and is, in turn, followed by another vowel. The opening effect of *r* is weakest when it precedes a vowel.

Needless to say, several of Deferrari's conclusions stand in marked contradiction to the observable developments in Italian, a fact which Deferrari himself is often hard-pressed to defend. For example, in considering the change of *sarmento* to *sermento*, which would

be highly unlikely given his posited hierarchy, Deferrari (p. 152) alludes to the possibility of analogy with certain forms in which the opposite development ensued, for example, *starnuta* < *sternuta*. More baffling, however, is Deferrari's attempt at accounting for the shift of *a* to *e* in the future and conditional of first conjugation verbs, for, in referring to the development of *cantare habeat* to *cantarà* to *canterà*, he states (p. 164):

The above-indicated development is consistent with our generalities for the opening effect of *r* . . . since [i] is the most frequent result of V. I. [initial syllable pretonic] vowels which were kept as vowels in Italian . . . the [e] of the above rule is very probably the result of the opening effect of *r*.

The only way to make sense out of this rather confused passage is to infer that the thematic vowels in question were first raised to *i*, by whatever means, and then subsequently lowered to *e* by the effects of the following *r*. Such an occurrence of course remains purely hypothetical, and is in fact contradicted by the abundant documentation, which fails to reveal any such tendency. In addition, one is left puzzled by Deferrari's reference to initial pretonic syllables, since the thematic vowel of the future and conditional, while pretonic, is certainly not in the initial syllable, except in the future and conditional forms of verbs like *dare*, *fare*, and *stare*, in which cases it remains as *a*!

The lowering power of *r* has also been postulated, in another context, by Otero (1971: 60), in speaking of a cited form *sarao* from the Galician-Portuguese *serão*. He notes that the former results from the latter 'con la *e* abierta por la *r* contigua, como en el Fr. *marché* 'mercado'. Gili i Gaya (1932: 245), in considering some similar data from Catalan, also speaks of 'la tendència general del català a obrir les vocals travades per *r* o *r*'. This proposed power to lower vowels has recently been nominated for language-universal status by Vennemann (1972: 883). Vennemann considers various developments apparently influenced by the presence of the alveolar trilled *r*, including data from Spanish and various Germanic languages, and concludes that *r* exhibits a definite propensity to lower vowels, although not without exceptions.

5. Seeing the field of enquiry thus divided, between those who feel that *r* tends to raise vowels and those who maintain that vowels are lowered in the vicinity of *r*, not to mention those who ascribe no special status whatsoever to *r*, one is left with a feeling of confusion as regards the effects of *r* in the Italian case under discussion. Each claim as to the possible phonetic effects produced by *r* has been accompanied by at least some concrete examples adduced as evidence. On the basis of these conflicting results, several possible conclusions tentatively emerge: first, that any particular effects to be attributed to *r* are language- and even situation-specific; second, that in evaluating the data, errors have been made regarding the possibility of an *r* either raising or lowering a vowel; third, that *r* exerts no influence at all on neighboring sounds, and that all reports to the contrary are erroneous. The third possibility seems to be in general refuted, owing to the large number of observations which have been reported in various languages; it is still possible, although rather unlikely, in the particular Italian example under consideration. In no other phonetic environment in Italian did [a] become [e], or vice versa, with any regularity; hence the conclusion implicating *r* in the change. As regards the actual direction

of any change motivated by *r*, one must delve into the phonetic and phonological features represented by the various segments under consideration. Perhaps the most useful way of visualizing the relationships between *a*, *e*, and *r* is to display these segments as simultaneous bundles of features, thereby manifesting any obvious traits the segments have in common. Starting first with the vowels *a* and *e*, there is not great deal of possible variation in the description of these segments, regardless of the descriptive framework chosen. In the Jakobsonian binary framework, the two vowels stand in the following relationship:<sup>6</sup>

$$\begin{bmatrix} -\text{dif} \\ +\text{cmp} \\ +\text{grv} \end{bmatrix} /a/ \qquad \begin{bmatrix} -\text{dif} \\ -\text{cmp} \\ -\text{grv} \end{bmatrix} /e/$$

Here the shift of *a* to *e* may be interpreted as a simultaneous raising and fronting, which is more clearly depicted by the articulatory features of Chomsky and Halle (1968), in which /a/ is specified as [+back], [+low] and [-round], while /e/ is [-back], [-low], and [-high]. As might be suspected, the problem lies in the specification of /r/. In the Jakobsonian distinctive feature framework, /r/ has been represented as:<sup>7</sup>

$$\begin{bmatrix} +\text{voc} & +\text{dif} \\ -\text{cons} & -\text{grv} \\ -\text{cmp} & -\text{cnt} \end{bmatrix}$$

Upon seeing such a display, one might be tempted to regard the change of [a] to [e] before [r] as an assimilation of the values of gravity and compactness. It must be remembered, however, that the features *grave*, *compact*, and *diffuse* refer to different parameters depending upon whether one is discussing vowels or consonants; consequently, the apparently similar specifications of /e/ and /r/ lose much of their plausibility: note also that the values of diffuseness is not assimilated. Intervocalic [r] on Italian is a single, voiced, alveolar flap, much like that occurring in American English *ladder*. It has no overt similarity to either [a] or [e], other than sharing such general features as voicing, and therefore a large measure of doubt is cast on the practice of classifying this sound as [+vocalic].

Within a more modern distinctive feature framework, Harris (1969: 46) has attempted to describe [r] as follows:

The segment [r] is simply a voiced apicoalveolar single flap. We may confidently assign to it at least the features [+vocalic, -consonantal, -obstruent, +voice, +anterior, +coronal -strident], and with only slightly less confidence, [+continuant, -tense].

Chomsky and Halle (1968: 177) adopt a similar specification for *r*, except that, unlike Harris, they specify /r/ as [-anterior]. Andersen (1968: 175) feels, however, that *r* is characterized by the specification [-continuant]. Vennemann (1972: 886) who, as noted

<sup>6</sup> Cf. Muljačić 1966; 1969: 396; Salterelli (1970a).

<sup>7</sup> *Ibid.*

earlier, considers [r] to exert a lowering influence upon neighboring segments, suggests that *r* be represented as [+low], at least in certain environments.

It is obvious that discussion of the specification of /r/ could be prolonged indefinitely; equally obvious, it seems, is the fact that the presently available distinctive features tell us little or nothing about any possible assimilatory effects [r] might have on contiguous vowels. In order to determine the latter, it is necessary to pause for a moment and consider the articulatory details of the Italian single intervocalic *r*. Although articulated in an area roughly between the points used to produce [d] and [z], [r] is a flap; that is, its manner of articulation is characterized by a rapid movement of the tip of the tongue from a point somewhere in the middle of the mouth against the alveolar region, and back again into a more central location. The full effect of the flap is produced only if the tip of the tongue travels sufficiently both before and after the point of contact. Thus, for example, in the nearly homorganic clusters [dr] and [zr], the apex of the tongue disengages itself from the production of the first consonant, lowers somewhat, and then returns to produce the flap, after which the tongue is lowered again. The point at which the tongue stops before and after the articulation of an [r] varies somewhat, but is invariably in the mid-front region of the mouth; i.e., in the area used in the production of [e] or [ɛ].<sup>8</sup> It seems, therefore, that any assimilatory effects which Italian [r] could possibly exert upon a preceding vowel would be such as to achieve a degree of tongue height like that of [e] or [ɛ]. In the case of a low vowel such as [a], therefore, one would look for a following [r] to raise and front the vowel somewhat; precisely this occurred in Italian; the full extent will be detailed below. Conversely, given a high vowel such as [i], a following [r] would potentially lower the vowel; significantly, most well-documented examples of purely phonetically motivated lowering enhanced by [r] involve high vowels.<sup>9</sup> Finally, in those cases where [e] or [ɛ] is followed by [r], one would not anticipate this consonant to exert a powerful influence on the timbre of the preceding vowel. Thus, for example, while first-syllable atonic [e] in Italian was generally raised to [i], it remained unchanged before [r]; compare *secūrus* > *sicuro*, *nīpōtem* > *nipote*, *mīliōrem* > *migliore*, *mīnōrem* > *minore*, *prehensiōnem* > \**prēsione* > *prigione*, *phoenīcem* > *finice*, with *cerebellum* > *cervello*, *vericundia* > *vergogna*, etc.,<sup>10</sup> in addition to numerous other forms like *berbice*, *cervigia*, *mercante*, *mercè*, *sermone*, *pernice*, *serpente*, and such infinitives as *servire*, *cerare*, etc. Meyer-Lübke (1890b: 78) also cites numerous forms where *i* was lowered to *e* before *r*, including *meraviglia*, *perucca*, *cerusico*, *laberinto*, *lucherino* and *smereglio*. Moreover, often vowels were inserted through hypercorrection or partial restoration, on the assumption that a vowel had been lost through syncope. Such an epenthetic vowel, being unstressed, was generally an *i*, except before *r*, where an *e* was inserted;

compare *supplere* > *sopperire*, *cithāra* > *cetra* > *cetera*, *cammārus* > \**gambro* > *gambro*, *macrum* > *magro* > *maghero*, *mītra* > *mītra* > *mītera*, *sēpāro* > *scevro* > Germ. *fādr* > *fodero*, with *blāspemat* > *biasma* > *biasima*, *cōllōco* > *corco* > *corico*, *phantāsmā* > *fantasma* > *fantasima*, *syрма* > *sirima*, *spasmus* > *sbasmo* > *spasimo*, etc. (cf. Grandgent 1927: 55, 60).

The full scope of evolutionary developments engendered by the presence of [r] does not emerge from anecdotal presentations of the sort to be found in historical grammars of Italian, but may be strikingly demonstrated by considering in greater detail the overall phonotactic evolution of Italian in terms of the rates of loss and retention of the various segments under consideration. In order to place the observations to be offered in this study on an empirical foundation, as well as to provide data to be utilized in a more comprehensive survey of Italian diachronic phonotactic now in progress, a statistical analysis was conducted on a suitably selected corpus of data designed to highlight the action of certain environments and segments. A full elaboration of the methodology employed must, for reasons of brevity, be postponed until such a point as the entire phonological history of Italian can be adequately surveyed, but a brief summary of the techniques will serve to substantiate the results to be reported below.

The choice of a representative corpus of data exemplifying the evolution of Italian from Vulgar Latin is a difficult and non-trivial task, since care must be taken not to introduce a bias into the results through the injudicious choice of particular classes of forms. For the purposes of this study, careful consideration yielded the conclusion that Meyer-Lübke's *Romanisches Etymologisches Wörterbuch* would provide the most feasible source of comparative diachronic data upon which a statistical analysis could be performed. The *REW*, while both comprehensive and reasonably accurate, is the work of a single, highly opinionated investigator, and anyone who has utilized this volume is aware of the inherent difficulties involved in drawing a large sample of data from Meyer-Lübke's dictionary. In order to minimize the indeterminacy of the ensuing results, it was decided to establish a list of categories which would be eliminated in principle during the process of selection, categories which for one reason or another promised to yield unsatisfactory results if lumped together with more unobjectionable cases. In some cases, only certain environments were excluded, with the result that a particular word might be allowed to furnish data regarding a particular environment, although other environments in the same word would be excluded from the tabulation. A full discussion of the rationale behind the excluded categories is beyond the scope of this brief presentation, but in most cases the motivation for the exclusion is obvious. All in all, the following types of words or environments were excluded from the data:

1. Forms showing no derivations in modern standard Italian.
2. Words of non-Latin origin.
3. Words formed with productive prefixes or suffixes.
4. Vowels of grammatical endings, including the theme vowels of infinitives.
5. Words of fewer than three syllables.
6. Vowels in hiatus, unless the hiatus was removed at an early date by a process such as metathesis.

<sup>8</sup> Actually, the central point reached in the articulation of [r] may be more centralized than that represented by the front vowels. For example, in Rumanian, the vowels /e/ and /i/ generally exhibit the centralized allophones [ə] and [ɨ], respectively, before and after [r], which also correspond to the vowel phonemes written *ă* and *î*, resp. (cf. Vasiliu 1968: 130; Lausberg 1956: § 229; Ruhlen 1973: 41).

<sup>9</sup> See Vennemann (1972: *passim*); for Spanish, see Navarro Tomás (1966).

<sup>10</sup> See the discussion in Meyer-Lübke (1890b: 78).

7. Words in which a vowel was absorbed through palatalization, labialization, or a assimilatory process.
8. Onomatopoeic words.
9. Words whose cited etymologies showed a high probability of morphological or analogical contamination, or words whose cited etymologies were dubious given the available data.
10. Vowels in verbal stems whose position with respect to the accent changes within the paradigm.
11. Proper names.
12. *Demonstrably* late borrowings from Latin.

The last category is particularly significant, since in most cases no attention was paid to Meyer-Lübke's classification of 'learned' and 'popular' words. Meyer-Lübke, like many other investigators, defined as 'learned' any word which did not undergo the usual phonetic modifications typifying the language in question, thus achieving complete circularity of results and rendering these classifications meaningless to any investigation of the rate of change or retention of any particular segment. The data to be reported below, therefore, contain many examples of words which have traditionally been regarded as 'learned', since only in this fashion can accurate figures concerning relative strength or weakness of individual segments or environments be computed. For this reason, the numerical results may not seem as striking as those which might be obtained by excluding such 'learned' words; however, in the latter case it is impossible to avoid circularity, and consequently impossible to achieve meaningful results on the phonotactic evolution of a language. The only words excluded on the basis of learned status were words which, either by virtue of additional data supplied by the *REW*, or through subsequent investigation, can be demonstrated to have been borrowed intact into later stages of the Italian language: most such words are technical terms or otherwise specialized vocabulary, and have little relevance to the evolution of the language as spoken by ordinary individuals.

Once the set of categories to be excluded was established, a random sampling method was devised which would provide a representative survey of the remaining words. This procedure yielded a corpus of more than 800 words, which were then subjected to a variety of statistical analyses in order to discover some quantitative facts concerning the phonotactic development of Italian.

The first set of data to be considered concerns the rôle played by [r] in contact with the vowels [a], [e], and [i]. The environments relevant to this aspect of the investigation are the posttonic penult, initial syllable pretonic, second syllable pretonic, and initial syllable pre-pretonic. The results for the vowel [a], culled from the entire corpus of data, are reported in Table 1. For brevity of presentation, only percentage figures are given; however, figures which do not appear to be statistically significant, due to the small number of cases involved, are placed in parenthesis: see at page 363

From the data presented in Table 1, one may clearly observe the effects of the following [r], as well as the intrinsic strength of [a] in other environments, thus demonstrating that the shift of [a] to [e] before [r] in the future and conditional is not the result of coincidence, but rather part of a more far-reaching phonetic process affecting the entire

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	posttonic penult	initial pretonic	2nd pretonic	initial pre-pretonic
per cent raised before [r]	100	5	100	(100)
per cent raised; other environ.	0	0	0	0

TABLE 1: Rate of raising of [a] to [e]

Italian language. These results may be brought into even clearer perspective by comparing them with the data concerning the evolution of atonic [e] in Italian. As a general rule, word-internal atonic [e] in Italian succumbed to a process of syncope, the details of which will not be discussed here. In word-initial atonic position, on the other hand, the general trend was toward the shift from [e] to [i], thus paralleling the raising of unstressed vowels occurring in several other Romance languages. In Table 2, it is possible to compare the rate of raising of atonic [e] in terms of the presence of specific conditioning environments:

	initial pre-pretonic	initial pretonic
per cent raised before [r]	0	0
per cent raised before nasal	0	19
per cent raised other environ.	78	79

TABLE 2. Rate of raising of [e] to [i]

From this table it may be clearly seen that the presence of a following [r] acted as an effective deterrent to the raising of atonic [e]. Almost as effective a deterrent in this situation was the presence of a following nasal consonant, presumably due to the nasalizing effect on the preceding vowel. Taken together, Tables 1 and 2 provide a striking overall picture of the assimilatory properties of [r] which manifested themselves during the early stages of the language. It may be seen that, in an atonic environment, the pre-

sence of a following [r] acted to produce a front vowel of approximately middle tongue height, as suggested by the phonetic considerations offered earlier. Obviously, these assimilatory properties were not of an exceedingly strong nature, since they were counteracted by tonic stress, among other factors, but the unmistakable raising and lowering tendencies of [r] are nonetheless evident from the complete analysis. In those cases where a reverse tendency has become manifest, it is often possible to detect one or more additional circumstances which served to counteract the assimilatory properties of [r], which are not of a powerful nature. For example, the lowering of [e] to [a] before [r] in the future and conditional of some southern Italian dialects appears to be largely the result of morphological analogy with the predominant class of first conjugation verbs, as well as being influenced by more general phonotactic factors. Similarly, those cases of early English lowering of [e] to [a] before *r* may find an explanation in the more retroflexed articulation of the English and Germanic *r*, thus justifying Vennemann's classification of /r/ as phonologically [+low].<sup>11</sup> In any event, the detailed properties of the Italian *r* are not captured by the presently available distinctive features, since they depend not so much on the actual point of contact during articulation, but rather on the accompanying movement of the tongue which both precedes and follows the actual moment of contact. To accurately depict this characteristic, one would need additional descriptive devices; for example, the introduction of a new feature such as *flap*, together with a set of synchronic and diachronic interpretive conventions indicating the interaction of this feature with other vocalic features.

6. Returning once again to the data from the Italian first conjugation verbs, it will of course be noted that the various assimilatory properties proposed for *r* are not of an absolute nature; that is, there are hundreds of Italian words exhibiting the phonetic sequences [ar], [ur], [ir], etc. Speaking of these developments, Meyer-Lübke (1967: 72) noted:

Il confronto tra *amare-hó* che muta l'*ar* in *er* (*ameró*) e *dormire-hó* che conserva *ir* (*dormirò*) s'insegna la cronologia relativa di questi fenomeni: LABYRINTU era già diventato *labyrinth* quando *dormire-ho* valeva ancora per due voci; conservando almeno un accento secondario sull'*ir* (e solo più tardi *dormire-hó* diventava *dormirehó*, ma, poichè allora gli *ir* non passavano più in *er*, s'arrestava a *dormirò*); invece, solo dopo la completa fusione di DORMIRE HO e AMARE HO ecc., MARGARITA diventava *margherita* (di conserva con AMAREHÓ *amerò*). Dunque IR *ir* è anteriore e AR *er* è posteriore alla fusione DORMIREHÓ, AMAREHÓ, ecc.<sup>12</sup>

<sup>11</sup> Cf. Vennemann (1972: 872) and Kurath (1964: 78) for a fuller discussion of the lowering influence of English *r*. A similar situation seems to have occurred in French Canadian, where the influence of a following [R] sometimes caused [e] to be lowered to [a]; e.g. Lat. MERDAM > Fr. *merde* > Fr. Can. [maRd], Fr. *merci* > Fr. Can. [maRsi], etc. For further discussion, cf. Orkin (1971: 66) and the *Glossaire du Parler Français au Canada* (1968).

<sup>12</sup> It should be noted in this regard that there is no evidence indicating that the shift of *ar* to *er* took place any earlier in verbal forms than in other words; indeed, traces of this change involving nouns are recorded from the earliest periods of Italian, and if Meyer-Lübke's observations are not erroneous, probably antedate the complete fusion of the Vulgar Latin analytic future and conditional forms into the synthetic forms in which the stem variation *ar* ~ *er* is exhibited.

In particular, the very endings of the first conjugation infinitives, -*are*, serve as proof that, if any tendency on the part of *r* to raise low vowels exists, there also exist factors which effectively counteract this tendency. One obvious contender is of course analogy, but unfortunately the raising of *a* to *e* before *r* is not confined to verbal forms; in fact Italian is full of words in which the same development ensued, words reported in Table 1. To cite but a few examples, we have *camāra* > *camera*, *camārus* > *gambero*, *mattāris* > *mattaro*, *sarmento* > *sermento*, *comparare* > (dial.) *comperare*, *separare* > (dial.) *sceverare*, *smaragdu* > *smeraldo*, *margarita* > *margherita*, etc.<sup>13</sup> Bourciez (1967: 485) cites *albero* from *arborem*, by confusion with *albārus*, also indicating the same tendency. What then, is the common factor occurring in all these words? Closer inspection of Table 1 reveals that in each case the [a] which was raised to [e] before [r] was unstressed; herein lies the key to a final solution. Italian, like the other Romance languages, has always exhibited a highly differential treatment of vowels, depending upon the presence or absence of stress. In Italian, unstressed vowels in word-internal position were often syncopated, a topic which will be returned to below, although not to extent to which syncope occurred in some of the other Romance languages. Pei (1941: 38) notes that, even when the vowels are not syncopated, they generally exhibit some sign of weakening, often through a change in timbre. A careful study of the statistical data collected, representing vowels in all atonic positions, yields the conclusion that the vowel [i] most readily succumbed to syncope, closely followed by [u]. Significantly, in the future and conditional of the most common third conjugation verbs, the *i* is also syncopated: *dirò* from *dire*, *morirò* from *morire*, etc.; this tendency was much more marked in the earlier stages of the language, as suggested by the remarks of Meyer-Lübke cited above. The vowel [e] was also syncopated, especially in the future and conditional of many verbs of the second conjugation. Most interesting, however, is the fact that [o] was hardly ever syncopated, except after having been previously raised to [u], and [a] never fell through syncope.<sup>14</sup> In fact, certain words containing an unstressed *i* or *u* changed this vowel to *o*, thus avoiding an encounter with syncope; for instance *thymīnus* > *temolo*, *ūvūla* > *ugola*, and so forth.<sup>15</sup> The tendency for *a* to resist syncope has called forth comment from many authors. For instance, Lausberg (1956: 156) noted:

In den übrigen Bereichten macht sich eine starke Tendenz zur Unterdrückung zwischen-toniger Vokale bemerkbar, was mit einer Übertreibung der Druckabstufung zusammenhängt. Am widerstandsfähigsten ist allgemein der schallstärkste Vokal *a*.

Tekavčić (1965: 141) added:

Per conseguenza, benché i verbi in -*are* facciano oggi il futuro e il condiz. affievolendo la vocale caratteristica *a* in *e*, la contrazione non avviene. Da ciò possiamo concludere che al tempo in cui è avvenuta la sincope la conseguente contrazione del lessema nei verbi in -*ere* il futuro e il cond. dei verbi in -*are* conservavano ancora la vocale caratteristica *a*. La vocale *a*, essendo la più resistente alla caduta, ha resistito alla sincope.

<sup>13</sup> Cf. d'Ovidio and Meyer-Lübke (1904: 671), Pei (1941: 39).

<sup>14</sup> Cf. Menéndez Pidal (1966: 67) and Grandgent (1934: 98).

<sup>15</sup> See Grandgent (1927: 58).

In viewing the results of syncope, it is therefore possible to establish a scale of vowels, based on the extent to which these vowels resisted syncope. The information on the evolution from Vulgar Latin to Italian suggests the following scale:<sup>16</sup>

$a \rightarrow o \rightarrow e \rightarrow u \rightarrow i$

The above scale indicates the relative frequency with which one could expect to find the various vowels subjected to syncope, and serves as a sort of implicational statement; i.e., if *e* is syncope, then *i* and *u* must be syncope, and so forth.

7. Intimately linked with the shift of *a* to *e* before *r* in Italian is the more general process of unstressed vowel raising. It is a well-known fact of Romance philology that, ever since the days of Vulgar Latin, unstressed vowels have shown a tendency to raise, a tendency which has operated with varying degrees of success among the various Romance languages. Raising of unstressed vowels attains its maximum dimensions in Brazilian Portuguese, where [a] > [ɐ], [e] > [i], [ɛ] > [e], [o] > [u], and [ɔ] > [o].<sup>17</sup> Similarly, in Catalan, unstressed [o] and [ɔ] > [u] and unstressed [a], [ɛ] and [ɛ] > [ə]. In Spanish, the tendency to raise unstressed vowels was much less pronounced, although examples may be cited. The developments in Spanish were sufficiently striking, however, to prompt the following comment from Makoto (1971: 38), whose full impact may perhaps be ascribed to a faulty translation: 'In the age of transition from Vulgar Latin to Castilian there appeared a tendency to hate low vowels and prefer the most idealistic vowel system . . .' In Italian, as previously mentioned, [e] was regularly raised to [i] in initial atonic positions, except before *r* and nasals, and sporadically raised, although more often syncope, in other atonic environments. In literary Tuscan, there are few examples of the raising of unstressed [o], but in the non-Florentine Tuscan dialects, as well as in the vulgar speech of Florence, this change is commonplace.<sup>18</sup> Unstressed *a* was generally not significantly modified in standard Tuscan, except in the cases before [r]. Somewhat raised variants, ranging from [ɐ] to [ə] occur in the spoken dialect, however, and are also found in various other regional dialects. It is interesting to observe that unstressed vowel raising, which is also a form of phonetic weakening, follows roughly the same vocalic hierarchy characteristic of syncope; that is, *e* is most frequently raised, followed by *o*, with *a* seemingly being the most resistant. Of course it is difficult to discover the phonetic status of *a* during earlier periods of Italian, for, unlike with *e* and *o*, no letter existed with which to represent a raised variant; equivalently, there was no other phoneme whose allophonic domain would be infringed upon by a raised variant of *a*. However, the existence of the raising process is a documented fact in the history of Italian, from which it may be inferred that unstressed *a* was subject to a constant tendency toward raising, which was often resisted due to the high position which this vowel occupies on the vocalic hierarchy. The combined tendency for an unstressed *a* to raise plus the potential raising and fronting properties exhibited by *r* could then be expected to inter-

<sup>16</sup> Foley (MSa, MSb) has presented a similar scale, except that the pairs *e/o* and *i/u* are grouped as being of equal phonological strength.

<sup>17</sup> Cf. the discussion in Lipski (1973).

<sup>18</sup> Cf. Grandgent (1927: 44).

act, and the *e* which often resulted before *r*, while not totally accounted for by these two factors, may be seen to follow the established tendencies of the language.

8. Even when the assimilatory properties of [r] and the general raising of unstressed vowels are taken into consideration, there still remains a lot of data to be accounted for; namely such forms as the future and conditional of *dare*, *stare*, *fare*, etc., which still preserve the atonic [a] before [a]. In order to bring these remaining forms under the rubric of an explanation, it will be necessary to study in greater detail the phonotactic structure of the Italian word. The key facts in this regard concern the distribution of stressed and unstressed syllables within the word. Except for a handful of unstressed monosyllabic forms, every Italian word receives primary stress on one of its syllables. In addition, words of three or more syllables often receive a secondary stress. Using the symbol (') to indicate (primary) stressed syllables, and (—) to indicate unstressed or weakly stressed syllables, the possible structures characterizing the conditional and future forms may be grouped as follows:

future		conditional	
(—')	<i>darà</i>	(—')	<i>darei</i>
(—'—)	<i>daranno</i>	(—'—)	<i>daresti</i>
(—'—')	<i>parlerà</i>	(—'—')	<i>parlerei</i>
(—'—'—)	<i>parleranno</i>	(—'—'—)	<i>parleresti</i>
(—'—'—')	<i>perdonerà</i>	(—'—'—')	<i>perdonerei</i>
(—'—'—'—)	<i>perdoneranno</i>	(—'—'—'—)	<i>perdoneresti</i>
(—'—'—'—')	<i>dimenticherà</i>	(—'—'—)	<i>darebbero</i>
(—'—'—'—'—)	<i>dimenticheranno</i>	(—'—'—)	<i>parlerebbero</i>
.	.	(—'—'—'—)	<i>perdonerebbero</i>
.	.	(—'—'—)	<i>dimenticherei</i>
etc.		(—'—'—'—)	<i>dimentichereesti</i>
		(—'—'—'—)	<i>dimenticherebbero</i>
			etc.

In examining the above chart, as well as the data presented in Table 1, a pattern is seen to be emerging: [a] was raised to [e] before [r] when followed by the main stressed syllable and preceded by at least one unstressed syllable; in those cases where the [a] was in the first unaccented syllable, it remained unchanged, hence *darò*, *starò*, etc. Consider now the accentual patterns exhibited by some of the other words involving the development of the configuration atonic *a* plus *r*:

(—'—)	<i>parare</i>
(—'—'—)	<i>margherita</i>
(—'—'—)	<i>ricovero</i>
(—'—)	<i>zucchero</i>

etc.

In these examples, we find confirmation of the hypothesis derived from examination of the future and conditional forms; in addition, it is possible to see that raising of atonic *a* before *r* occurred in the *mirror image* environment: when immediately following the stressed syllable and followed by at least one unstressed syllable. Here then is a more useful sort of generalization, which specifies the precise environments in which raising of *a* was the general rule. Given these data, it will now be possible to formally display the results of this process in terms of a diachronic rule.<sup>19</sup> Consider, therefore, the form assumed by a rule depicting the results of the interaction of *a* and *r* in Italian, roughly:<sup>20</sup>

$$(1) a \rightarrow e / \left\{ \begin{array}{l} \check{V} C_1 [-\text{stress}] r \check{V} \\ \check{V} C_1 [-\text{stress}] r \check{V} \end{array} \right\}$$

Such a rule, while formally describing the observable data, is highly unsatisfactory for a number of reasons. First of all, it is necessary to state the rule in terms of two disjoint environments. Superficially, it looks as though we have another case of a 'mirror-image' rule as defined by Bach (1968); closer inspection reveals, however, that the notational devices proposed by Bach will not permit the two neighborhoods in (1) to be collapsed in an illuminating fashion. A new notational convention is needed which would permit the two neighborhoods to be neatly and economically collapsed. Such a proposal has been offered by Naro (1971: 58), using a notational device first introduced by Langaker (1969: 858-9) and Harris (1970). Naro has suggested using a double slash // to indicate that what follows to the right is actually two mirror-image sequences. Using Naro's notation, (1) may be rewritten as:

$$(2) \check{a}r \rightarrow \check{e}r // \check{V}C_1 \_ C_2 \check{V}$$

In reality, however, even this statement is not formally adequate, since the true consonantal environments are not correctly indicated: the sequence  $\check{V}C_1 r C_2 \check{V}$  is inconsistent with the Latin stress pattern carried over into Italian, while the pattern  $\check{V}r C_2 \check{V}$  is equally rare. A few examples might be adduced, however, which would allow the rule

<sup>19</sup> The term 'rule' here is not to be interpreted in the strict generative sense as advocated, for example, by King (1969) and Halle (1962), who view sound change as the addition of integral 'rules' to the formal grammars of speakers of the language. A change such as the one under discussion is highly complex and evidently results from the interlocking action of a number of diverse phenomena. It is quite unlikely that any such 'rule' could be incorporated as a whole into the grammar of Italian speakers; rather, the change portrayed in (1) is the end result of a process which evidently required several centuries for consummation. As a consequence, the statement presented by (1) is merely a schematic representation of a 'metachronic equation', giving the before and after stages and saying little or nothing about the intervening events. In particular, there is no claim to the effect that (1) represents a single change which could be portrayed by formally adding a single 'rule' to a previously existing grammar.

<sup>20</sup> The development of *smaragdu* to *sméraldo* may be accounted for by the fact that, particularly in the early stages of the language, the initial *s* of such clusters had syllabic value. Cf. the discussion in Andersen (1972: 34) and Bourciez (1967: 48, 156) for further remarks on this subject.

to stand on formal considerations alone. As an interesting aside at this point, it might also be noted that, taken as it stands, (2) appears to contradict the claims of Naro (1971) to the effect that *all* mirror-image rules are neighborhood assimilation rules. Although one might wish to claim that the shift of [a] to [e] before [r] is due to a form of assimilation, as noted above, there is nothing in the surrounding environment which may be interpreted as having exerted an assimilatory or dissimilatory influence on the sequence [ar].

The restatement offered in (2) does not add any value to the analysis presented in (1), since the point is not to evaluate the simplicity or generality of a proposed description. The events in question actually took place, and the motivation for them has already been tentatively suggested. What is needed instead is a theoretical insight which will clarify the relationship between diachronic processes and formal representations.

More serious than the descriptive shortcomings of (1) or (2) is the fact that they fail to reveal anything about the true nature of the process involved. Even allowing for the full expansion of all segments in terms of distinctive features and making provisions for the assimilatory effects of *r* along the lines suggested above, there seem to be two almost arbitrarily chosen conditioning environments. There is no indication of precisely what effect the configuration of stressed and unstressed syllables had upon the development of [ar], nor why another configuration would not have produced the same results. These are questions which must be answered by any diachronic theory laying claim to completeness, and in the case under discussion, the answers lie in a more detailed examination of the unstressed syllables of the Italian word.

9. Although each polysyllabic non-compound Italian word receives only one primary stress, the amount of articulatory energy allotted to each of the unstressed syllables is by no means uniform. There is, in fact, a clearly defined tendency for certain unstressed syllables in Italian to be more strongly articulated than others; most noteworthy is the initial pretonic syllable (preceded by a consonant), which generally resists syncope or other forms of effacement. Grandgent (1934: 91) feels that this preferential treatment may be due to a 'lingering influence of the Old Latin accent'. Final atonic vowels also seem to have fared better than many of their word internal counterparts, despite their general weakness in terms of articulatory energy. Pei (1941: 37) speculates that a desire on the part of more educated speakers to retain markings of gender and number may account for the relative diachronic strength of this position. Word-internally, however, the situation is substantially different. Based on the data collected from the *REW*, a statistical analysis was made of the rate of syncope for the various atonic positions under consideration. Care was taken to include only those examples in which loss of a vowel produce a structurally compatible cluster, so that spurious 'hierarchies' did not emerge through failure to consider the criteria of phonotactic compatibility. These data were then broken down vowel by vowel, with essentially the same overall results in each case. As an additional bit of confirmatory information, measurements were made on the spoken speech of speakers of modern Tuscan, in which the relative intensity of atonic vowels was measured; again, the results obtained in this experiment coincide with those based on diachronic observations, thus implicating stress or intensity as the major factor responsible for the hierarchical behavior of atonic environments across time.

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On the basis of the historical data, it was possible to establish a hierarchical scale of *positional strength* which accounts for the varying behavior of unstressed vowels. From the outset, at least three levels of diachronic phonological strength may be discerned: starting with the primary stressed and secondary stressed vowels, we may refer to this level as strength 3. Next come final vowels, and initial atonic vowels preceded by consonants, which may be designated as strength 2. Finally, we come to word-internal pretonic and posttonic vowels, as well as initial pretonic vowels in absolute initial position, which, for the time being, may be called strength 1.<sup>21</sup> Using this set of values, a partial reformulation of the above charts will place matters in a somewhat different perspective:

(2-3)	<i>darà</i>
(2-3-2)	<i>daranno</i>
(2-3-1-2)	<i>darebbero</i>
(2-1-3)	<i>parlerà</i>
(2-1-3-2)	<i>parleranno</i>
(2-1-3-1-2)	<i>parlerebbero</i>
(3-1-2)	<i>camera</i>
(2-1-1-3)	<i>perdonerà</i>
(2-1-1-3-2)	<i>perdoneranno</i>
(2-1-1-3-1-2)	<i>perdonerebbero</i>
(2-3-1-1-3)	<i>dimenticherà</i>
(2-3-1-1-3-2)	<i>dimenticheranno</i>
(2-1-1-1-3-1-2)	<i>dimenticherebbero</i>

etc.

From this chart it may clearly be seen that [a] was converted to [e] before [r] in precisely those positions in which it was assigned a positional strength of 1. In these positions, the relative phonological strength of *a* was weakest, and therefore the assimilatory effects of *r*, which did not operate on vowels in stronger positions, could act to raise the *a* to *e*.

The notion of relative positional strength permits an obvious and straightforward method of rewriting (1) and (2), namely as:

(3)  $a \rightarrow e / \overline{[\text{strength } 1]} r$

<sup>21</sup> Saltarelli (1970b: 94) calls for the secondary accent to fall on pretonic vowels and tertiary accent to fall on unaccented posttonic syllables. These conclusions do not find support in the historical developments affecting the syllabic structure of Italian words. In addition, it must be recalled that positional strength is not to be strictly equated with accentuation, although in many cases the two are closely related. It should also be noted at this point that the possible rôle of the unstressed syllable in aiding the change under consideration was noted by Rohlf's (1949: v. 2, § 587) and Lausberg (1956: § 293; v. 2, § 845). However, in the works of these authors, no reference is made to the inherent diachronic behavior of the various atonic positions, or to the relationship between the diachronic strength of a particular unstressed vowel and its susceptibility to assimilatory influences.

The statement embodied in (3) is a simple and concise representation of the fact that certain Italian future and conditional forms exhibit a vocalic alternation resulting from an evolutionary development which also encompassed other, nonverbal forms. To a very large extent, (3) is also a productive synchronic rule of modern Italian, accounting for the alternations in the first conjugation verbs, and stating a phonotactic generalization about most of the native Italian vocabulary. In its present form, however, it is nothing but a bit of shorthand notation, standing by convention for a complex series of historical developments, but devoid of any theoretical content. One must resist the temptation to interpret this formal notation as having inherent significance, or causal powers. In order to propose that (3) is the only correct representation for the events in question, it remains to be shown the manner in which such a notation may be made compatible with current phonological theory. More specifically, one must face the question of how the notion of positional strength is to be incorporated into the theory of diachronic descriptions.

Clearly, the values of phonological strength cannot be introduced directly into the phonological representations of the vowels. This is obvious, since in their underlying representations, these vowels are unspecified as to stress, which is later supplied by a system of rules. Nor can a strength-assigning function be included as part of the general stress rules, since stress may shift within a derivational or inflectional paradigm, thereby causing a reassignment of the relative strength values. It is, in fact, clear that what will be needed is some sort of interpretive conventions that will assign the correct values of strength *relative* to the main stress; i.e., which will be put into effect *after* the primary stress has been located within the word. These conventions would take the form of *phonotactic interpretive projections*, which would serve to include a value of relative positional strength in the final specifications of each vocalic segment in each word. Such projections must be largely if not entirely language-specific, forming in effect part of the metatheory of Italian grammar. As visualized in the present investigation, these interpretive conventions form an integral part of the grammar in question, and augment the effects of specific rules. Put into effect, they operate over an entire discourse, and as such may be properly considered as a type of 'meta-condition' which characterizes any utterance which a speaker might produce. It should also be noted that, in the particular case under consideration, that of strength hierarchies based on phonotactic position, the values assigned will not always find an exact match in the directly measurable phonetic production of a word; for example, although the final atonic syllable of an Italian word may be assigned a value of [strength 2] or perhaps even [strength 3], based on its historical tendency to resist apocope, it is often articulated as weakly as any word-internal atonic vowel. The values of strength reflect therefore not the actual physiological intensity, but rather the phonological behavior characterizing vowels in various positions and established on the basis of historical observation, although of course close correlations may and generally do exist between phonological hierarchies and their physical correlates.

Once primary stress has been situated in a word, either by means of lexical specification or by a rule of stress assignment, the relative strength of the remaining syllables may be accounted for by phonotactic interpretive conventions of roughly the following sort:

- (4) a)  $\hat{V} \rightarrow [3 \text{ strength}]$     c)  $\hat{V} \rightarrow [2 \text{ strength}]/-C_0 \neq$     e)  $\hat{V} \rightarrow [1 \text{ strength}]/\neq-$   
 b)  $\hat{V} \rightarrow [3 \text{ strength}]$     d)  $\hat{V} \rightarrow [2 \text{ strength}]/\neq C_1-$

As presently formulated, c) assigns the value [2 strength] to final atonic syllables, while d) and e) take care of initial vowels. The remaining cases, namely word-internal pretonic and posttonic vowels, may be handled by the methodological convention that all environments not specifically assigned a value of positional strength 2 or 3 are automatically assigned a value of strength 1; thus, e) and the other similar conventions covering the remaining environments need not be explicitly stated, since the positions in question occupy the lowest place on the phonological strength hierarchy.

The conventions proposed in (4) are highly rudimentary in nature, and require many additions and corrections before a true phonotactic characterization of all Italian words can be achieved. For example, it will eventually be necessary to take into further consideration the particular consonants surrounding the vocalic environments, in order to account for potential assimilatory and dissimilatory effects; in addition, it will be imperative to consider the number and class of consonants occurring in each case, since such factors determine the syllabic structure of the word, which in turn affects the positional strength of the various syllables. Moreover, provision will have to be made for compound words, as well as for certain derivational forms in which the accentual pattern of the root word more strongly asserts itself. It will probably also be necessary to distinguish more than three levels of strength, in order to accurately characterize words with two or more word-internal atonic vowels in succession, since in such cases, a sub-hierarchy is usually evidenced by subtle diachronic developments.<sup>22</sup> Even in words like *parlerebbero*, the stress may not be evenly distributed between the pretonic and the posttonic vowel, although these differences are usually negligible.<sup>23</sup> Only a first step in this direction is offered in (4), but the directions seem clear enough from this formulation.

10. A theory of phonology which makes essential use of phonological hierarchies is clearly more desirable than one in which rules are stated in terms of seemingly arbitrary conditioning environments and developments. Based on the data from the history of Italian, one example of hierarchization has been offered, which may be used in interpreting and evaluating diachronic developments, an example dealing with the relative strength attached to particular phonotactic environments. It was seen that establishing a strength scale for vocalic environments led to a natural and straightforward characterization of a seemingly complex development. A good deal of further investigation is called for before a proposal of this nature can be unhesitatingly admitted into phonological theory. Clearly the burden of proof falls on anyone wishing to introduce new proposals into an established theory. Despite the tentative remarks contained in this study, the burden still remains. In view of the complexity of phonological change, it appears certain that the current view of phonology will have to be expanded to include at least some new proposals, and phonological hierarchization of the sort discussed in this endeavor seems to rank in the list of possible additions.

<sup>22</sup> Cf. Menéndez Pidal (1966: 74).

<sup>23</sup> This matter is discussed at some length in Pope (1934: 112).

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