As the title indicates, I want to argue that there is a complementarity between synchronic and diachronic explanation in phonology, specifically as regards the analysis of phonological alternations. The complementarity I want to propose can be stated in terms of the life cycle of alternations that has been familiar to phonologists since the work of Kruszewski and Baudouin de Courtenay. Roughly, as long as an alternation remains a automatic response to an exceptionless constraint resulting from sound change, its explanation is to be sought in the diachronic realm from which the constraint originates. Once the alternation ceases to be automatic in this sense, though, it becomes subject to reanalysis in terms of principles of synchronic grammar that are quite unlike the principles governing sound change. In particular, sound change, while it undeniably has a psychological component, can typically be traced back to peripheral or external factors like aerodynamic restrictions, gestural overlap, and perceptual confusability. Reanalysis, in contrast, appears to be governed in many cases by principles that reward a property that might be called "salience", as manifested in factors like lexical frequency or status as an isolation form.

There is very little if anything that is original in this point of view. Further, I don't have anything to add here to our understanding the first half of the claimed complementarity, that involving the origin of automatic phonology in sound change. What I want to try to do is to document a particular kind of reanalysis and inquire into the principles governing it. While much of the material I present will involve diachronic developments, my focus throughout will be on what diachrony can tell us about synchronic analytic decisions and the principles that drive them.

The talk is divided into three sections. The first discusses the Portuguese case of reanalysis sketched in my abstract, and the second introduces the database of reanalyses also mentioned there. The third illustrates the format of that database with an account of the epenthesis observed in zero-suffixed Czech genitive plural forms.

1. Portuguese lowering

The Western Romance seven-vowel system was subject to a neutralization rule reducing unstressed ɛ ɔ to e o (I will refer to the former pair of vowels as low and the latter pair as mid, and assume that they are [+low] and [–low], respectively). Because verb paradigms included both stem-stressed and suffix-stressed forms, this neutralization resulted in alternations between stressed ɛ ɔ and stressless e o for stems whose last vowel was *ɛ ɔ (*negare "deny", *rogare "ask"). In Portuguese, this alternation in the value of [=low] was extended to stems whose last vowel was *e o (*peskare "fish", *podare "prune") and which thus were originally nonalternating (see Williams 1938:206ff).

Let us ask how this extension of the lowness alternation can be understood. One apparently straightforward mode of explanation would be to say that stems whose last vowel was nonalternating /e o/ were relexicalized as containing /ɛ ɔ/ instead and came to undergo the inherited neutralization rule as a result. There are reasons to be skeptical about this proposal, however. The first might be called the argument from explanatory adequacy. This assumes that in making a descriptive proposal, we should keep one eye on questions of explanation—that is, on the question of what explanatory principles will be available to explain why the proposed analysis was chosen from among multiple available alternatives. In the present case, unless we have a theory of what factors trigger or encourage relexicalization, the proposal that Portuguese e/o-stems were relexicalized as e/ɔ-stems will remain unmotivated and in that sense will fare badly with regard to issues of explanation.

A more concrete reason to be skeptical about the relexicalization proposal is that there is a small number of cases in which the alternation with low vowels under stress has been extended to verbs that originally had nonalternating high vowels and continue to show high vowels in suffix-stressed forms (frigir "fry", fugir "flee"). These cases cannot be accounted for by assuming relexicalization of the stem vowel as /ɛ ɔ/, since this would predict that stressless alternants of the verbs in question should have mid vowels rather than the observed high vowels.
In seeking to explain the extension of the lowness alternation, there is a natural alternative to the proposal that mid-vowel stems were relexicalized as low vowel stems and the alternation continued to be governed by the inherited neutralization rule. This is to assume that speakers postulated a rule lowering mid vowels under stress in verb stems, inverting (Vennemann 1972) the directionality of the original neutralization rule. The extension of the $e/o \sim \varepsilon/\ddot{o}$ alternation to originally nonalternating mid vowels will then be the result of generalization of this innovative lowering rule. In fact, it is generally assumed that Portuguese has a lowering rule with the requisite properties (see e.g. Harris 1974:75). That rule can be written so as to apply exceptionally to verbs like frigir and fugir, so that it is not subject to the second objection we raised above to the relexicalization proposal. How does the proposal of a lowering rule, however, fare with regard to the argument from explanatory adequacy?

The rule of lowering presupposes that in the alternation of unstressed mid vowels with stressed low vowels, the mid vowels are basic or underlying; alternatively, it is the stressless stem alternants that are underlying. This choice of URs can be seen as the result of the fact that suffix-stressed forms are far more frequent in the verbal paradigm than stem-stressed forms. Concretely, and taking a conservative variety of Portuguese as representative, there are roughly 60 forms in a verbal paradigm (six person-number combinations each for nine subparadigms; two imperative and four nonfinite forms); equivalently, there are 60 morphosyntactic feature complexes with which a stem can co-occur. Of these 60 forms, precisely nine, or 15%, are stem-stressed. The Portuguese choice of stressless alternants as underlying in this situation thus follows from a quantitative criterion, one that can be unified with the traditional notion of type frequency (de Chene in press). This choice of URs is also echoed by the fact that when stress-based stem alternations are leveled in other Romance languages, it is generally in favor of stressless alternants.

The choice of mid vowels—equivalently, unstressed verb-stem alternants—as underlying represents what can be called a neutralizing choice of URs, one which targets neutralized rather than contrastive values of alternating features or segments. Correspondingly, this choice will have created a "division of the lexicon", a distinction between alternating and nonalternating $e/o$-stems that needed to be marked with a lexical diacritic. Depending on which set of stems was taken as unmarked, two outcomes would have been possible. Taking nonalternating stems as unmarked would require alternating stems to carry a diacritic triggering lowering, which would therefore be a minor rule. Loss of this "rule feature" from lexical entries over time would result in leveling of the lowering alternation in favor of the underlying value $e/o$. Taking alternating stems as unmarked, on the other hand, would require nonalternating stems to carry a diacritic blocking application of lowering. Loss of this "exception feature" from lexical entries would result in extension of the lowering alternation to previously nonalternating stems.

As we have already seen, it is the second analysis that was adopted. It was the alternating rather than the nonalternating pattern, that is, that was taken as regular. About this analytic decision as well we need to ask whether it can be understood in terms of plausible explanatory principles. Here the answer is not as clear as it was in the case of UR choice. In particular, while lexical frequency is in general a plausible candidate for a parameter determining which of a set of competing alternations will be taken as regular, it is not clearly decisive in this case, given that the numbers of alternating and nonalternating verbs seem to have been roughly equal in the inherited lexicon. This question, then, requires further consideration.

To summarize, the Portuguese extension of the originally automatic alternation between stressed $\varepsilon/\ddot{o}$ and stressless $e/o$ to nonalternating mid-vowel stems is naturally seen as the result of two analytic choices. First, in a neutralizing choice of URs, unstressed alternants were taken as underlying, creating a lexical distinction between alternating and nonalternating $e/o$. Second, in what can be called a denormalizing choice of regular alternation, the alternating rather than the nonalternating pattern was taken as regular, resulting in the rule of Lowering (for the term "deneutralization", see Nevins and Vaux 2007). Nonalternating stems, originally exceptions to Lowering, lost their exception feature over time and came to undergo the rule; today, Lowering has no lexical exceptions, although its results are overridden by constraints prohibiting the low vowels $\varepsilon/\ddot{o}$ in certain contexts (nasality, hiatus, adjacency to a palatal).
2. Toward a database of reanalyses

The two analytic decisions we have identified in the Portuguese case, a neutralizing choice of URs followed by a
deneutralizing choice of regular alternation, define a type of reanalysis that has theoretical implications of some
interest. First, if neutralizing UR choice does occur with any regularity, it calls into question the idea that, in analyzing
inflectional alternations, speakers are looking to maximize some a priori desirable property of the analysis as a
whole—for example, predictability of nonbasic alternants, consistent with the feature-counting evaluation metric of
classical generative phonology (Chomsky and Halle 1968) or predictability of inflected forms (Albright 2002.ix and
passim). Second, apart from cases in which the null alternation is taken to be regular and leveling results, the choice
of a regular alternation from a set of competing alternatives represents the induction of an innovative phonological
rule, one that does not originate in sound change. Study of the properties of alternations that speakers have
generalized in this way potentially offers a window on the conditions defining a possible phonological rule that is
independent of the constraints imposed by sound change. For example, alternations resulting more or less directly
from sound change will in general involve a close phonetic relation both between the basic and the derived alternants,
on the one hand, and between the derived alternant and the environment, on the other. With regard to the
induction of innovative rules, however, historical and experimental evidence seem to converge in suggesting that
while the phonological distance between the alternants is a crucial variable, the relationship between the change and
the environment is far less important (Moreton and Pater 2012:711-712).

It is with these considerations in mind that I have taken the first steps toward creating a database or inventory of
reanalyses that involve neutralizing UR choice and the induction of an innovative rule, concentrating on cases in which
the innovative rule belongs to the word-level phonology. At this stage, the database takes the form of a chart with
eleven columns. The first column identifies the language involved, the lexical category displaying the relevant
alternation, and whether that alternation affects stems or suffixes. The remaining ten columns, labeled A. though J.,
contain the following information:

A. The source of the alternation in sound change (insofar as is known)
B. UR candidates at the outset of reanalysis (unit = morph)
C. Innovative URs
D. Criterion for UR choice (insofar as is known)
E. Rule candidates resulting from UR choice
F. Innovative rule
G. Criterion for rule choice (insofar as is known)
H. Lexical irregularity (originally; at present)
I. Comments
J. References

At present, the database contains cases from Korean, Portuguese, Japanese, Greek, Maori, Czech, Uyghur, and Catalan,
as well as a number of other cases that are as yet incompletely documented. As an example, I present the Czech
case, which, as noted above, involves epenthesis in zero-suffixed genitive plural forms. I follow the above checklist,
supplying additional detail as necessary. For data, I am indebted to Scheer 2011 and Scheer et al. 2009, as well as to
searches of the online Dictionary of Literary Czech (http://ssjc.ujc.cas.cz/), maintained by the Institute for the Czech
Language of the Czech Academy of Sciences.

3. Czech genitive plural epenthesis

Modern Czech has three nouns whose stem is /metr/, all loans from French; the meanings are "meter" (French
mètre), "master" (French maître), and "underground railway" (French métro). The first two are masculines, while
the third is a neuter. Here, we will take "meter" as a representative of the two masculines and compare its
decension with that of "metro". The declensional suffixes involved are shown in the following charts:
As the charts show, most declensional suffixes are vowel-initial, but there are zero-suffixed forms in both paradigms. Before vowel-initial suffixes, both stems are non-alternating. Our focus will be on what happens in the zero-suffixed forms, as illustrated in (1).

(1) a. Nom/Acc Sg of "meter" /metr-∅/ [metr]
   b. Gen Pl of "metro" /metr-∅/ [meter]

As noted by Scheer et al. (2009:18), the two forms in question, while phonologically identical, are distinct on the surface: the Gen PI of "metro" appears to undergo an epenthesis rule that does not apply to the Nom/Acc Sg of "meter". Scheer et al. analyze this difference representationally, taking the Gen PI zero suffix to be an empty CV unit, while the Nom/Acc Sg suffix is literally zero. Here, I will take the apparent epenthesis in the Gen PI at face value, returning to the analytic difference with Scheer et al. at the end. With our focus now on the vowel-zero alternation in the paradigm of "metro", I proceed to the checklist items:

A. The source of the alternation in sound change

The ultimate source of the vowel-zero alternation in question is the "fall of the yers", the deletion of short high vowels in weak positions in Late Common Slavic. Calculating from the right edge of the word, yers were strong when the following syllable contained a weak yer and weak otherwise. In nominal paradigms, therefore, a yer in the final vowel of a stem was strong when the ending was a yer (Nom/Acc Sg in most masculines, Gen Pl in most feminines and neuters), but weak when the ending contained a full vowel. Strong yers lowered to mid vowels, while weak yers deleted. Yer endings thus disappeared, while stem yers came to alternate between mid vowels (in Czech, /e/) in forms where the ending had been a yer and zero otherwise.

B. UR candidates at the outset of reanalysis

As a result of yer lowering and deletion, stems like *jьgl- "needle" (feminine) and *окьн- "window" (neuter) came to alternate between a shape [XCeC] in the Gen Pl and a shape [XCC] in the rest of the paradigm (modern forms shown):
These two alternant types were thus both candidates for UR status.

C. Innovative URs

Alternants of the shape \[XCC\] were chosen as underlying.

D. Criterion for UR choice

As in the Portuguese case, paradigmatic frequency is a plausible explanation for this choice of URs.

E. Rule candidates resulting from UR choice

In addition to stems of the shape /XCC/ that alternated with \[XCeC\] word-finally, there were also nonalternating stems of the shape /XCC/, stems that ended in clusters in Common Slavic. There were thus two candidates for a regular pattern of alternation given inputs of the form /XCC#/ in the Gen Pl, an epenthetic pattern and a nonalternating pattern.

F. Innovative rule

The two patterns of alternation in question seem to have remained stable through the Old Czech period—that is, at least until about the year 1400. At some point, however, the epenthetic pattern began to spread to formerly nonalternating stems. This can be seen as indicating that the epenthetic pattern had been taken as regular—in particular, as resulting from the rule (2).

\[(2) \emptyset \rightarrow e / C_C N\]_{[GenPl]}

Correspondingly, non-epenthesizing stems were now lexically marked exceptions to (2); as their lexical entries were simplified by loss of the exception feature, they came to undergo the rule.

It must be emphasized that rule (2) cannot be entirely separated from phonotactically conditioned epenthesis in word-final clusters. As Scheer et al. (2009) point out, all word-final /Cn/ clusters underwent epenthesis, those that occurred in Nom/Acc Sg forms as well as those occurring in the Gen Pl. Conversely, word-final /st/ clusters (among others) fail to undergo epenthesis even in the Gen Pl. On the other hand, it is clear that rule (2) is still in the process of being generalized: as shown by searches of the online Dictionary of Literary Czech, it has spread to final /sk/ in feminine genitive plurals, but applies only variably to final /sk/ in neuter genitive plurals. It may thus eventually spread to final /st/ as well.

G. Criterion for rule choice

A search of the Etymological Dictionary of the Slavic Inherited Lexicon (Derksen 2008) for feminines in -a and neuters in -o attested in some form of Czech suggests that in those two groups of nouns, original nonalternating stems of the shape /XCC/ were more than twice as common than stems of the shape /XCC/ that alternated with [XCeC] in the Gen Pl. The origin of rule (2)—that is, the choice of the alternating pattern as regular—can thus apparently not be attributed to considerations of lexical frequency. As indicated, phonotactic factors have certainly played a role.

Let us now return to the distinction between "meter" and "metro" with which we began. Note than in the historical antecedent of the masculine paradigm of "meter" that we saw above, the [XCeC] alternants resulting from yer vocalization will have occurred in the Nom/Acc Sg rather than in the Gen Pl. I suggest that with regard to UR choice, the criterion of paradigmatic frequency was overridden in that paradigm by the existence of an unsuffixed isolation form in the Nom/Acc Sg, the semantically most basic forms of the paradigm. For alternating masculine stems, in
other words, [XCeC] rather than [XCC] was taken as underlying. With the results of yer vocalization thereby lexicalized, there was no basis for postulating an epenthesis rule.

Finally, I suggest that this account of the difference between the zero endings of the "meter" and "metro" paradigms is better motivated by general principles than a purely representational account and in that sense fares better than such an account with regard to the argument from explanatory adequacy that we invoked against the relexicalization proposal in the Portuguese case. Noting, with Scheer et al. (2009), that the differential treatment of the two types of zero ending was an innovation of the Middle Czech period, we can infer that the primary data must have contained a trigger for the differential analysis at a point when the two types of zero ending were still realized phonetically in the same way. It seems less plausible that something in the primary data at that stage told children that Nom/Acc Sg zero in the masculine paradigm was really zero, but that Gen Pl zero in the feminine and neuter paradigms was an empty CV sequence than that the innovation of differential treatment was the result of the analytic decisions concerning UR choice and rule choice that we have outlined here.

References


dechene@waseda.jp