# SYNCHRONIC RECONSTRUCTION

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1.   Reconstruction

Historical linguistics recognizes two types of reconstruction. Comparative reconstruction compares cognate forms from two or more languages and posits an historical form from which the attested forms can be derived by plausible historical changes. A typical example is shown in (1).

(1)   Sanskrit: pitā́
       Greek: patḗr   PIE: *pətḗr
       Latin: pater
       Gothic: fadar
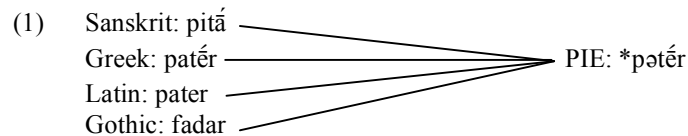
By comparing cognate forms in related languages, "the comparative method produces *proto*-forms, which cluster around a split-off point, a node in a family tree" (Anttila 1989: 274).

   Internal reconstruction compares related forms in a single language to determine a single form in an earlier stage from which those attested forms can be derived. A textbook example is Campbell's (2004: 242) first exercise in his chapter on internal reconstruction, from German given in (2).

(2)   [ty:p]   Typ   'type'   [ty:pən]   Typen   'types'
       [to:t]   tot   'dead'   [to:tə]   Tote   'dead people'
       [lak]   Lack   'varnish'   [lakə]   Lacke   'kinds of varnish'
       [tawp]   taub   'deaf'   [tawbə]   Taube   'deaf people'
       [to:t]   Tod   'death'   [to:də]   Tode   'deaths'
       [ta:k]   Tag   'day'   [ta:gə]   Tage   'days'
          (Data: Campbell 2004: 242)

This leads us to reconstruct historical forms in (3) and to posit the sound change in (4).

(3)   *ty:p   *to:t   *lak   *tawb   *to:d   *ta:g

Sound change:
(4)   [–sonorant] > [–voice] / ____ #

According to Raimo Anttila, "[i]nternal reconstruction gives *pre*-forms, which can reach to any depth from a given point of reference…" (Anttila 1989: 274).

In this case we have actual historical records. It is known that Old High German had word-final voiced consonants but that, in the Middle High German period, these had undergone devoicing. In King's words, "…final devoicing was an innovation in the grammar of most German dialects around A.D. 1000, in any case not later than 1200" (King 1969:53). Can internal reconstruction provide information about phonological changes a thousand years prior to the data being examined, while ignoring many other changes that took place during this period? King's answer is that the solution in (5) represents synchronic underlying representations and that modern German possesses a phonological rule of the form (6).

(5)   /ty:p/   /to:t/   /lak/   /tawb/   /to:d/   /ta:g/

Phonological rule:
(6)   [–sonorant] → [–voice] / ＿＿ #

To quote Anttila again, "[i]nternal reconstruction is already known to the reader, as it is exactly the same as morphophonemic analysis…" (Anttila 1989: 264). To put it another way, internal reconstruction amounts to determining a phonological rule which was added to the grammar of a particular language. According to King, "[s]ince rule addition is one of the commoner kinds of primary change, the simplest assumption is that this state of affairs arose through rule addition" (King 1969: 158). However, King also notes "that the mere presence of a rule in the grammar does not necessarily imply that the rule was added: it could have always been in the grammar" (King 1969: 159). The historical evidence in this case seems to indicate that Final Devoicing was not always part of the grammar of German, as shown by the orthographic forms of Old High German in (7).

Old High German:
(7)   tag 'day,' gab 'he gave,' lamb 'lamb,' rad 'wheel'

But some OHG manuscripts use unvoiced symbols to spell final devoiced obstruents, as in the examples from Tatian cited by Braune 1975: <giscrīp> 'scriptura' <arstarp> 'died' (Braune 1975: 125) <sculdīc> 'schuldig' (guilty) (id. p. 139). Middle High German more consistently spells final obstruents with unvoiced symbols, as in *tac* 'day,' where a voiced symbol appears in inflected forms in nonfinal position, as in *tage* 'days.' Interestingly enough, Modern German has returned to the practice of spelling such forms consistently with the voiced symbols as in *Tag* [ta:k] 'day,' plural *Tage* 'days.' According to King, "…scribes devise symbols for the underlying systematic phonemic segments of the language" (King 1969: 208–09). This claim would seem to be true of Modern German but not of Middle High German. Whether it is true of Old High German is the point at issue. However, we can return to comparative reconstruction. As King puts it, "[t]o clinch the argument one has to go to the comparative evidence: if related languages lack the rule, we assume that it was

an innovation" (King 1969: 159). In this case we can consider Old English and Gothic cognates, as in (8).

(8) *Comparative evidence*
     Old English dæġ, pl. dagas
     Gothic dags (acc, voc dag, pl dagōs)

2. Relation of Synchrony to Diachrony

Traditional historical linguistics regarded the synchronic state of a language as a product of its history, where, once a sound change had occurred, the language was immediately reconstructed to include the change. Generative grammar, by contrast, conceives of the synchronic state of a language as containing a complex system of rules, and of historical change as involving manipulation of that set of rules, among other factors. So, the German example of section 1 can be regarded as involving the addition of a rule of Final Devoicing (6) to the grammar of German around 1000 A.D. According to Chomsky & Halle (1968=*SPE*), "[i]t is a widely confirmed empirical fact that underlying representations are fairly resistant to historical change, which tends, by and large, to involve late phonetic rules" (*SPE:* 49). A somewhat stronger position was maintained earlier by Halle, who states that *"[i]t can readily be seen that in cases where the addition of such a rule does not affect the over-all simplicity of the grammar,* the order of rules established by purely synchronic considerations—i.e., simplicity—will mirror properly the relative chronology of the rules" (Halle 1962: 389 [emphasis added]). Halle appears here to create the impression that a synchronic grammar is a collection of the rules that have been added to it in the course of history, in the same synchronic order as their relative chronology. However, the insistence on simplicity as the measure of a synchronic grammar leaves open the possibility of restructuring the grammar at any point that the historically justified order of rules becomes more complex than some alternative where some of the historical rules are lost and underlying representations are restructured along somewhat more concrete lines. Kiparsky puts it this way:

> It is a very natural, though theoretically unjustified, desire to have synchronic descriptions reflect diachrony to the greatest possible extent. The greater the similarity between synchronic and historical grammars, the less work either of them involves for the linguist. It would be ideal if we could simply provide the arrowheads of historical grammars with shafts to get synchronic descriptions, and perform the converse operation on *The Sound Pattern of English* to get a history of English phonology. But unfortunately we cannot assume that synchronic grammars have a form which takes the hard work out of internal reconstruction. Children learning their native language do not have the interests of linguists at heart. (Kiparsky 1968: 130).

In the pre-Generative period, linguists like Leonard Bloomfield and Rulon Wells understood the distinction between synchronic and diachronic description that Kiparsky emphasizes (see also Goldsmith 2005). Bloomfield writes:

> The process of description leads us to set up each morphological element in a theoretical *basic* form, and then to state the deviations from this basic form which appear when the element is combined with other elements. If one starts with the basic forms and applies our statements…in the order in which we give them, one will arrive finally at the forms of words as they are actually spoken. Our basic forms are not ancient forms, say of the Proto-Algonquian parent language, and our statements of internal sandhi are not historical but descriptive and appear in a purely *descriptive order*. However, our basic forms do bear some resemblance to those which would be set up for a description of Proto-Algonquian, some of our statements of alternation…resemble those which would appear in a description of Proto-Algonquian, and the rest…, as to content and order, approximate the historical development from Proto-Algonquian to present-day Menomini. (Bloomfield 1939: 58).

Wells (1949) expresses a similar view concerning the relation of synchronic and diachronic grammars when he notes "…that the dynamically basic alternant does not always represent a historically older form is proved, for example, by an illustration in §5: although, descriptively, Gk stómat 'mouth' is dynamically basic to stóma, there was never, historically, a nominative singular stómat which was later replaced by stóma" (Wells 1949: 112, fn. 26). "…a synchronic description of ancient Greek would unquestionably take stómat as he basic morph of 'mouth'…" (ibid. 102, fn 12a).

King summarizes the relation between synchronic and diachronic grammar as follows: "…any change…is ultimately rooted in the process of two dialects having become different" (King 1969: 28). "This includes the possibility that one of these dialects is the immediate chronological predecessor of the other…[t]o say that dialects have become different is to say that the grammars of these dialects are different" (ibid: 39). King goes on to describe phonological change in terms of rule addition, rule loss, rule reordering, and rule simplification.

3. Misinterpretation of the Generative View

Some authors have seriously misunderstood the generative approach to historical phonology as developed by Halle, King, Kiparsky, and Postal (1968), among others. McMahon mistakenly assumes that these authors simply equate sound changes and synchronic phonological rules (McMahon 2000: 5) and takes the relation between the two as involving a mechanism whereby "a sound change, once implemented, is inserted as a phonological rule at the end of the native speaker's rule system…a sound change and the synchronic rule it is converted to will tend to be identical" (McMahon 2000: 9). This is actually the reverse of the interpretation intended by the generative view of sound change, in which the implementation of the rule *is* the addition of the rule. McMahon

(2000: 9) quotes the passage from Halle (1962) given at the beginning of section 2, but omits the italicized portion of this quote, creating the impression that Halle advocated a view of historical phonology in which rules are constantly being added at the end of the grammar with no further changes taking place; thus the grammar becomes incrementally more complex over time. Clearly, Halle intended an interpretation where simplicity considerations would eventually force a restructuring of the grammar in such a way that it no longer directly reflects the diachronic order of the addition of the rules.

4.   Internal Reconstruction or Synchronic Reconstruction?

Campbell (2004: 240–1) gives an example from Balto-Finnic languages[1] involving both internal and comparative reconstruction, that seems to lead to a paradox. We provide the relevant data in (9).

(9)	*Finnish*	*Estonian*	*North Saami*
Nominative Singular	jalka	jalg	juolʲke
Genitive Singular	jalan	jala	juolʲge
gloss	'leg'		

Internal reconstruction in Finnish yields a pre-Finnish form **jalka* for the stem and *-n* for the genitive suffix, with an historical change whereby /k/ is lost at the onset of a closed syllable, known as consonant gradation. Estonian has undergone two additional changes, the loss of final vowels in certain contexts and the loss of final /n/. Some additional data (still entirely within the language, not involving comparative data) are required to arrive at the internal reconstruction in this case, which is quite similar to Finnish, namely, the pre-Estonian form **jalka* for the stem and a genitive suffix consonant of (internally) indeterminate quality, for which Campbell uses the notation X. The loss of the last stem consonant /k/ (orthographically <g>) is due to consonant gradation in Estonian as well. North Saami has also lost final /n/ in an independent change and consonant gradation here involves mere voicing of the final stem consonant /k/ rather than its loss. Internal reconstruction here yields a result similar to Finnish and Estonian. The results of internal reconstruction for the three languages are summarized in (10).

(10)	*Pre-Finnish*	*Pre-Estonian*	*Pre–North Saami*
Nominative Singular	jalka	jalka	juolʲke
Genitive Singular	jalka-n	jalka-X	juolʲke-X

According to Campbell, applying internal reconstruction to the three languages independently factors out the alternation represented by the consonant gradation

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[1] North Saami is not strictly Balto-Finnic but a member of the Lapp family. Lapp and Balto-Finnic are sister language families in the Finno-Saamic group.

that appears in all three languages. If the comparative method is then applied to the result of internal reconstruction, one would arrive at forms essentially like those of Pre-Finnish in (10), which would lose sight of the common appearance of consonant gradation in all three languages, and incorrectly conclude that Proto-Balto-Finnic did not have consonant gradation. As Campbell puts it, "[n]otice now that if we compare only the results of internal reconstruction in these three sister languages, we have no access to the alternation…However, if the comparative method is applied before internal reconstruction, the alternation is revealed to have been part of the proto-language…The moral is clear: internal reconstruction can help by offering forms to be compared in the comparative method which see past the disruptions of many recent changes; nevertheless, caution should be exercised so that alternations which should legitimately be reconstructed to the proto-language by the comparative method are not factored out by previous internal reconstruction and then lost sight of" (Campbell 2004: 241).

Campbell proposes that, in this case, the comparative method should be applied first, but he offers no clear rule as to the general procedure to be followed in applying the two forms of reconstruction. Anttila (1989: 274) reveals a similar indeterminacy. According to him, the internal reconstruction of consonant gradation in Finnish has "produced a form that antedates the time depth that can be claimed for the comparison of Finnish and Lapp…." This is similar to the question of German that we noted in (1): the "internal reconstruction" there produced forms far older than we can comfortably call by the name pre-Modern German. Anttila continues, "[b]ecause of the indeterminacy of the time depth of internal reconstruction compared with the temporal homogeneity given by the comparative method, their respective results must be labeled differently. Internal reconstruction gives *pre*-forms, which can reach to any depth from a given point of reference…whereas the comparative method produces *proto*-forms, which cluster around a split-off point, a node in a family tree. Thus *pre*- refers to anything preceding a node, *proto*- to a node itself" (Anttila 1989: 274).

In reality, the paradox is more apparent than real. The problem arises from regarding internal reconstruction as a purely historical tool, denying any depth to synchronic phonology. Using the same method synchronically as a means of discovering the underlying representations and rules of a language at a given point of time resolves the issue: the three Balto-Finnic languages in (9) all have a synchronic rule of consonant gradation and synchronic underlying representations of the forms given for Pre-Finnish. Using the method in this way does not lose sight of the alternation in the three daughter languages, as assumed by Campbell; the alternation is expressed by the rule established on the basis of the alternation in each language. Since the rule of consonant gradation is part of the grammar of the three daughter languages, it can be attributed to the parent language (King 1969: 176). There is no need to puzzle over which type of reconstruction to do first.

5. Kasem

Newton (1971) considers another possible way of relating synchronic grammar to historical change. The data is from the West African language Kasem as described by Callow (1965). *SPE:* 358ff discuss it as an example of synchronic rules of metathesis and contraction. The data in (11) are from Callow's class C, in which the singular has the suffix +*a* and the plural has the suffix +*i*.

(11)

		singular	*plural*	*gloss*	*underlying stem*
	a.	bakada	bakadi	'boy'	/bakad/
		sada	sadi	'grass mat'	/sad/
	b.	kambia	kambi	'cooking pot'	/kambi/
		pia	pi	'yam'	/pi/
	c.	pia	pæ	'sheep'	/pia/

Chomsky & Halle analyze these data in terms of rules of Metathesis (12), Truncation (13), and Contraction (14), and some other rules that are not directly relevant.

(12) Metathesis (Kasem)

$$\begin{array}{cccc} & V & V & V \\ & 1 & 2 & 3 \\ \Rightarrow & 2 & 1 & 3 \end{array} \quad \text{(condition: except when 2=3=[a])}$$

(13) Truncation (Kasem)

$$\begin{bmatrix} V \\ \alpha\text{high} \\ \beta\text{back} \end{bmatrix} \rightarrow \emptyset \ / \ \underline{\quad} \begin{bmatrix} V \\ \alpha\text{high} \\ \beta\text{back} \end{bmatrix}$$

(14) Vowel Contraction (Kasem)

ai → æ

Of particular interest are the singular and plural of 'sheep,' derived in (15).

(15)

/pia+a/	/pia+i/	underlying
———	pai+i	Metathesis
pia	pai	Truncation
———	pæ	Vowel Contraction
[pia]	[pæ]	

Newton (1971) interprets Metathesis and Truncation as sound changes, and rejects the condition Chomsky & Halle imposed on metathesis that it not apply when 2=3=[a]. This condition serves to block Metathesis in forms such as the singular of 'sheep,' but it is ad hoc and can be dispensed with if Truncation can be allowed to apply first in such forms. He tries to account for the synchronic

situation in the following terms. "If, on the assumption that generative phonology will in principle recapitulate such stages in the historical development of a language as are recoverable by internal reconstruction, we set up these [/pia+a, pia+i/] as proto forms, them, taking our cue from the synchronic description offered by the authors [Chomsky & Halle], we may account for the intermediate forms [pia] and [pai] respectively by postulating the occurrence of two sound changes…metathesis [and truncation]…We will further suppose that the two 'rules' operated over unknown stretches of time but that (a) the onset of truncation preceded the onset of metathesis, and (b) truncation did not cease to operate until metathesis had come into play" (Newton 1971: 33). Newton provides a diagram, reproduced here as (16), to illustrate his proposal.

(16)   Truncation   Metathesis
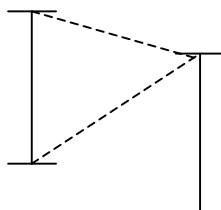
The vertical lines represent the rules and the short horizontal lines represent their onset and termination. The dashed lines represent the crucial linkages between the end points. Newton then considers two historical stages. In the first, Truncation alone is active and this affects the input /pia+a/ giving [pia] but has no effect on /pia+i/. At the second stage, both rules are active and the inputs are /pia/ and /piai/. Neither rule can affect /pia/. Metathesis converts /piai/ to /paii/. Since Truncation is still active, it operates on this intermediate form to give [pai]. His discussion would appear to reflect an internal reconstruction of the history of these forms in a neogrammarian framework, but is hard to see as part of a synchronic grammar in generative terms. Sound changes occur in time, but the rules of a synchronic grammar must all be present in a speaker's brain at the same time. For this analysis to be interpretable at all, it has to be regarded as historical; for example, immediate restructuring of /pia+a/ to /pia/ must be assumed at the first stage. Thus it is difficult to accept his criticism of generative phonology that it results from the "fortunate accident" (p. 34) that historical phonological processes do not overlap very often in the manner discussed in the Kasem case. Historical phonological processes do not directly reflect synchronic rules or vice versa, though the relation between these two is not settled.

Anderson (1969: 113ff and 1974: 152ff.) proposes a local ordering solution to the Kasem case. Like Newton, Anderson rejects *SPE*'s solution in the ad hoc condition on the Metathesis rule that it is blocked when 2=3=[a]. He observes that, in the derivation starting from /pia+i/ 'sheep pl.,' the ordering of metathesis before truncation is feeding, hence unmarked and expected under local ordering. In the derivation from /pia+a/ 'sheep sg.,' neither order is unmarked. If Metathesis (without *SPE*'s condition) precedes Truncation, the

output of Metathesis is /pai+a/, to which Truncation cannot apply, thus a bleeding order. If Truncation precedes Metathesis, Truncation produces /pia/, to which Metathesis cannot apply, hence this is also a bleeding order. This latter order is in fact the one required to produce the correct output. Local ordering cannot predict the order of two rules where both possible orders are marked. In this situation, Anderson proposes a contingent restriction on the ordering: Truncation precedes Metathesis. Such contingent ordering restrictions are to be distinguished from absolute ordering restrictions that require a marked order of some pair of rules even when an unmarked order is available. The contingent restriction in Kasem is interpreted as being enforced when there is no unmarked option. The unmarked feeding order is invoked in the plural, and the contingent restriction is required for the singular.

6.   French

Lass (1975: 13–15) discusses an example from French involving the alternation of oral and nasal vowels. Representative data is in (17), from Lass (1975: 13).

(17)   a.   b.

   i,   nɔ̃   'name'   nɔme   'to name'

   ii.   fɛ̃   'end'   finir   'to finish'

   iii.   œ̃   'one, m.'   ynə   'one, f.'

Applying internal reconstruction yields an analysis with three ordered rules, giving derivations such as those in (18) (See also Schane 1968).

(18)   *Synchronic derivations*

nɔm#	nɔme#	fin#	finir#	Input
nɔ̃m	—	fĩn	—	Nasalization: V → [+nasal] / ____ N#
nɔ̃		fĩ	—	Nasal Deletion: N → Ø /____ #
		fɛ̃	—	Lowering: [V, +nasal] → [–high]
nɔ̃	nɔme	fɛ̃	finir	Output

The actual history of these forms (Pope 1934: ch. XI) is actually quite different. Nasalization began with low vowels in the tenth century and took nearly two centuries to spread to the high vowels. The original final /m/ of *nom* 'name' became /n/ at one stage, and only later deleted. Nasalization originally occurred before intervocalic nasals as well as before word-final (probably more generally syllable-final) nasals; subsequently denasalization (15th – 17th centuries) took place, affecting first high vowels, then lower vowels. So the actual history, shown in (19), is considerably more complex than the technique of reconstruction suggests.

(19) *Historical stages*

nɔm#	nɔme#	fin#	finir#	Input
nɔ̃m	nɔ̃me	—	—	Nasalization: [V, –high] → [+nasal] / ____ N#
		fĩn	fĩnir	Nasalization: [V, +high] → [+nasal] / ____ N#
nɔ̃n	—	—	—	Dentalization of nasal
—	—	—	finir	Denasalization of [V, +high] in open syllable
—	nɔme	—	—	Denasalization of [V, –high] in open syllable
nɔ̃		fĩ	—	Nasal Deletion: N → Ø / ____ #
		fɛ̃	—	Lowering: [V, +nasal] → [–high]
nɔ̃	nɔme	fɛ̃	finir	Output

Thus, internal reconstruction gives an overly simple and in fact inaccurate picture of the history in this case. Internal reconstruction cannot recover what Lass calls "see-saw" changes like the nasalization and subsequent denasalization in *finir,* nor can it recover mergers like the /m/ → /n/ in *nom* that do not result in alternations. Lass concludes that the reconstruction is valid as a synchronic morphophonemic description, but this too has been challenged, for example, by Tranel (1981), who claims that nasal vowels in French are underlying and not derived by rules such as those in (18).

7. Results of Reconstruction

Lass (1975: 8) notes that some authors, e.g., Maher 1969, Derwing 1973, have claimed that generative phonology is really historical internal reconstruction in disguise, while the reverse accusation, that historical linguists claim to be recovering history when they are actually discovering synchronic underlying representations, has rarely if ever been made. King's approach (1969: 157ff) is perhaps closer to this latter view. As we discussed in section 1, German final devoicing is observed to be a synchronic rule of German, and may represent a sound change also, the result of the addition of the final devoicing rule to the grammar. The method of generative phonology is based on the assumption that a common underlying representation for each morpheme is the source of variation in the phonetic form of that morpheme as produced by general rules, suppletion aside; for example, German /ta:g/ underlies [ta:k] and [ta:gə]. The counterpart to this assumption in internal reconstruction, viewed historically, is that variation in the shape of a morpheme at one stage of a language (again barring suppletion) represents a uniform shape for that morpheme at an earlier stage of the language (Hockett 1958: 463; Marchand 1956: 246). As we noted in section 1, King rejects this assumption. From the generative point of view, the presence of a rule (such as final devoicing in German) does not necessarily imply that it was added—it might always have been there. Lass notes that the historical assumption "leads, ultimately, to a very odd claim about language history" (Lass 1975: 9). That is, "since ALL morphophonemic alternations must go back to a nonalternating state, this means that behind every language—at some time

depth—is a proto language with NO ALTERNATIONS AT ALL" (Lass 1975: 10). This would mean that reconstructed protolanguages are unlike the languages derived from them in a fundamental way, violating the uniformitarian principle (Labov 1978). The assumptions of generative phonology do not make this odd claim: The synchronic underlying representations make no claim of historicity. Furthermore, the historical assumption sometimes fails, as Lass (1975: 10) notes. The ablaut of Germanic strong verbs, using Old English as representative, as in (20), leads to reconstructed Indo-European vowels, with possibly an older stage including laryngeals. But there is no way to reconstruct an earlier stage without the alternation and without the ablaut rule.

(20)		Old English	Reconstructed I.-E. stem vowel		
infinitive		beran	*e	<	*e
preterite singular (1ˢᵗ & 3ʳᵈ)	bær	*o	<	*Oe
preterite plural		bǣron	*e:	<	*eE
past participle		boren	*Ø	<	*H

As Lass puts it, "[t]here is no evidence for an 'innovation'; as far as we can tell the alternations MUST ALWAYS HAVE BEEN THERE." (Lass 1975: 10).

8.   Maori

Lass (1975: 16ff) points to a problem for the view that in general the most general generative phonological analysis of a given set of data is the psychologically correct one, a question raised by Hale 1973. In Maori, verbs have active and passive forms such as those in (21), along with the most general generative analysis, with the underlying representations shown and the rule in (22).

(21)	*Active*	*Passive*	*Gloss*	*Underlying*	*Passive:*
	awhi	awhitia	'embrace'	/awhit/	/+ia/
	hopu	hopukia	'catch'	/hopuk/	
	aru	arumia	'follow'	/arum/	
	tohu	tohuŋia	'point out'	/tohuŋ/	
	mau	mauria	'carry'	/maur/	
	wero	werohia	'stab'	/weroh/	

(22) $C \rightarrow \emptyset / \_\_\_\_\#$

Hale notes six points that indicate that the psychologically real analysis is more complex, with the underlying form of each root being identical to the active form (/awhi/, etc.) and six (possibly more) allomorphs of the passive (/+tia/, /+kia/, /+mia/, /ŋia/, /+ria/, /+hia/) distributed according to arbitrary diacritics on each verb root. The evidence for this view is summarized in (23).

(23) a.   Nominal stems used verbally in spontaneous discourse take -*tia*.

      b.   Derived causatives take -*tia* even if their basic stem takes a different suffix:
> *hopu* 'catch,' passive *hopukia*.
> *fakahopu* 'cause to catch,' passive *fakahoputia*.

      c.   Certain adverbials agree in voice with a verb using the suffix -*tia* regardless of the passive suffix on the verb.

      d.   English loanwords, even ending in a consonant, take -*tia*.

      e.   Compound verbs formed by incorporation of an adverbial phrase take -*tia*.

      f.   Any verb can take -*tia* if the conventional passive form is forgotten.

Lass concludes that, in this case, internal reconstruction has indeed provided historical information, and that a rule like (22) is an innovation in Maori. This may not be obvious from an examination of the closest relatives of Maori, all of which seem to have a similar restriction against word-final (in fact, syllable-final) consonants. Samoan (Marsack 1962) has a similar distribution of passive suffixes, except that the default suffix is -*ina* rather than -*tia* as in (24).

(24) *Samoan*

Active	*Passive*	*Gloss*
amata	amataina	'begin'
ave	avea	'take'
mata'u	mata'utia	'fear'
fuli	fulisia	'capsize'
alofa	alofaŋia	'love'
nofo	nofoia	'sit'
ula	ulafia	'smoke'
inu	inumia	'drink'
tau	taulia	'fight (a battle)'
tete'e	te'ena	'reject'

The distantly related language Bahasa Indonesia (Crowley 1997: 120) has cognate forms that end in the consonant that would be expected on the basis of internal reconstruction of Samoan, as in (25).

(25) *Bahasa*

Indonesia	*Samoan*	*Gloss*
minum	inu	'drink'
takut	mata'u	'afraid'
taŋis	taŋi	'weep'

This information allows us to conclude that the Polynesian languages underwent an innovation that involved the loss of word-final consonants, just as the lack of

word-final devoicing in Gothic and English allows us to conclude that final devoicing was an innovation in Middle High German.

9.   Conclusion

Internal reconstruction, alias generative phonology, is a procedure that allows for the discovery and description of patterns in a language. The assumption that such patterns are internalized by native speakers in the course of language acquisition is the basis of generative phonology. That such patterns reflect historically earlier stages of the language was one of the bases of traditional historical linguistics. The historical implementation of this technique relies on several assumptions that no longer appear to be valid. One is that historical change involves the conversion of phonetic forms directly to other phonetic forms without any more abstract representations. Another is that variation in the form of a morpheme is to be related to earlier uniformity in the shape of that morpheme. We have rejected these assumptions. The use of this technique in generative phonology does not suffer from these objections, since no historicity is claimed for synchronic underlying representations. An abstract underlying representation, along with the rule that accounts for an alternation, can persist for hundreds of years, as with German final devoicing. Generative grammar assumes that language change is change in grammars, not change in sounds directly.

Nevertheless, generative phonology does not always yield psychologically real synchronic analyses, as shown by the Maori example and possibly by the French. In both synchronic analysis and historical reconstruction other sources of information have to be used in conjunction. These include external sources of evidence in the case of synchronic grammars and written records and comparative evidence in the case of historic reconstruction.

References

Anderson, Stephen R. 1969. *West Scandinavian Vowel Systems and the Ordering of Phonological Rules.* Ph.D. dissertation, MIT. IULC.
——— (1974). *The Organization of Phonology.* New York: Academic Press.
Anttila, Raimo 1989. *Historical and Comparative Linguistics. Second revised edition.* Amsterdam: Benjamins.
Bloomfield, Leonard 1939. Menomini morphophonemics. *Travaux du cercle linguistique de Prague* 8: 105–115. Reprinted in Makkai (1972: 58–64).
Braune,Wilhelm 1975. *Althochdeutsche Grammatik* (13. Auflage, bearbeitet von Hans Eggers). Tübingen: Max Niemeyer Verlag.
Callow, John C. 1965. Kasem nominals—A study in analyses. *Journal of West African Languages* 2: 29–36.
Campbell, Lyle 2004. *Historical Linguistics: an Introduction.* Cambridge, MA. MIT Press.
Chomsky, Noam & Morris Halle 1968. *The Sound Pattern of English.* New York: Harper & Row.
Crowley, Terry 1997. *An Introduction to Historical Linguistics* (3rd edition). Auckland: Oxford University Press.

Derwing, Bruce L. 1973. *Transformational Grammar as a Theory of Language Acquisition.* Cambridge: Cambridge University Press.

Goldsmith, John A. 2008. Generative phonology in the late 1940s. *Phonology* 25: 37–59.

Hale, Kenneth 1973. Deep-surface canonical disparities in relation to analogy and change: an Australian example. *Current Trends in Linguistics* 11: 401–458.

Halle, Morris 1962. Phonology in generative grammar. *Word* 18: 54–72. Reprinted in Makkai (1972: 380–392). [Slightly different version reprinted in *The Structure of Language: Readings in the Philosophy of Language,* Jerry A. Fodor & Jerrold Katz (eds.) 1964. Englewood Cliffs, N.J.: Prentice-Hall.]

Hockett, Charles F. 1958. *A Course in Modern Linguistics.* New York: Macmillan.

King, Robert D. 1969. *Historical Linguistics and Generative Grammar.* Englewood Cliffs, NJ: Prentice-Hall.

Kiparsky, Paul 1968. How abstract is phonology? in Kiparsky (ed.) (1971): 119–163.

——— (1971). *Explanation in Phonology,* Dordrecht: Foris.

Labov, William 1978. On the use of the present to explain the past. in Philip Baldi & Ronald N. Werth (eds.) *Readings in Historical Phonology.* University Park, Pennsylvania State University Press, 275–312.

Lass, Roger 1975. Internal reconstruction and generative phonology. *Transactions of the Philological Society* 74: 1–26.

Maher, John Peter 1969. The paradox of creation and tradition in grammar: sound pattern of a palimpsest. *Language Sciences* 7: 13–24.

Makkai, Valerie Becker (ed.) 1972. *Phonological Theory: Evolution and Current Practice,* New York: Holt, Rinehart, & Winston.

Marchand, James W. 1956. Internal reconstruction of a phonemic split. *Language* 32: 245–253.

Marsack, C.C. 1962. *Teach Yourself Samoan.* London: The English Universities Press.

McMahon, April M.S. 2000. *Lexical Phonology and the History of English.* Cambridge University Press.

Newton, Brian E. 1971. Ordering paradoxes in phonology. *Journal of Linguistics* 7: 31–53.

Pope, Mildred Katharine 1934. *From Latin to Modern French.* Manchester: Manchester University Press.

Postal, Paul 1968. *Aspects of Phonological Theory.* New York: Harper & Row.

Schane, Sanford A. 1968. *French Phonology and Morphology.* Cambridge, MA: MIT Press.

Tranel, Bernard 1981. *Concreteness in Generative Phonology: Evidence from French.* Berkeley: University of California Press.

Wells, Rulon S. 1949. Automatic alternation. *Language* 25: 99–116.