AGREEING WITH NOTHING: OPACITY AND THE IMPLICATIONS OF THE MINIMALIST PROGRAM FOR PHONOLOGY[*]

J .   J O S E P H   P E R R Y
University of Cambridge

ABSTRACT This paper examines the implications of a strong homology between the operations of phonology and syntax, taking as its starting point the Agree operation proposed to hold in phonology by Nevins (2010). It is found that the strongest homology sharply constrains the interactions between agreement and deletion. Apparent exceptions to this prediction are examined, and it is argued that they have preferable alternative analyses.

1 INTRODUCTION

1.1 *The Framework*

This paper takes as its starting point the proposal by Nevins (2010) that a homologue of syntactic AGREE is responsible for phonological assimilation and harmony processes in a wide variety of languages. It is my belief, if taken seriously, has important implications for a range of phenomena in phonology.

Clearly one of the main attractions of this approach is that, by unifying a phonological phenomenon with a syntactic operation, we are able to reduce the total number of operations and thereby to obtain a more parsimonious account of the structure of the language faculty. If we take the AGREE operation to be identical to the syntactic operation, as we might expect if it had been co-opted in some way, then it should apply in the course of some phonological derivation, which constructs a hierarchical structure composed of some primitive phonological feature matrices (including, but not necessarily limited to, segments - the items to which AGREE is proposed to apply). The operation by which this structure is built may, for convenience, be called MERGE – which may also be assumed to be homologous to the syntactic operation, although nothing in this paper hinges on this. Let us propose that, once a derivation

is completed, it is mapped to interfaces with other components of the (broad) language faculty: the conceptually necessary interfaces are those with the externalisation system and the morphosyntax. The morphosyntactic interface is also the point at which phonology interacts with the lexicon.[1]

Let us further propose that these points of interface are the *only* points at which phonology interacts with either the phonological inventory or the lexicon. This is both the most parsimonious assumption and the most restrictive one – proposing multiple points of interface would require a more complex mechanism as well as reducing the predictive power of our theory. Let us call the phonological derivation *before* transfer to the interfaces the *Narrow Phonology.* Again, the most parsimonious proposal is that the Narrow Phonology consists only of MERGE and AGREE.

(1) *Proposed Architecture of the Language Faculty*
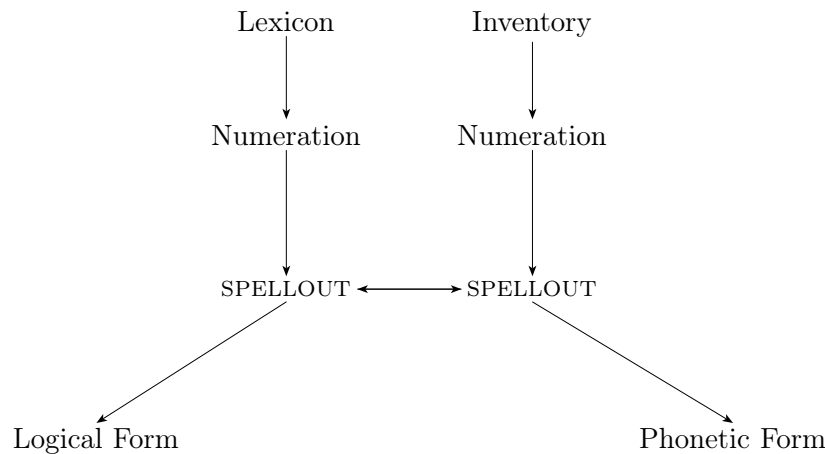
The final part of our theory which needs explanation is our theory of features. In syntax, AGREE applies to value (and thereby mark for deletion) features which are not interpretable at the LF interface. We can ascribe a similar function to AGREE in phonology – features which are not present in the lexicon and therefore at the morphosyntactic interface, but which are found in the inventory, must be marked for deletion at that interface in the Narrow Phonology[2], and AGREE is an obvious candidate for an operation to achieve

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1 I have intentionally left the details of this interface vague. The essential idea is that the output of the phonological derivation here maps on to the phonological features which exist in the morphosyntax. The phonological derivation is not thought of as a mechanism for the insertion of those features, but as simply as a means by which the phonological features of the morphosyntax and the phonetic externalisation are linked.

2 We are tacitly assuming the principle of FULL INTERPRETATION here - that is, that all elements at some interface should recieve an interpretation (Chomsky 1986).

this. Again by analogy with syntax, we may call the relevant features *uninter-pretable.* We assume that Agree applies when a *probe* (a phonological feature matrix with an uninterpretable feature) seeks out a *goal* (a phonological feature matrix with a corresponding valued feature) and values its uninterpretable feature on the basis of that goal[3], marking it for deletion at the morphosyntactic level. These features are realised in the phonetic form of the output but not in the lexical entry.

1.2 Predictions

We have taken it to be the case that, when the narrow phonological derivation is complete, the same structure is mapped to the morphosyntactic interface and the externalisation system. This means that it must contain all the information necessary to determine its realisation at those interfaces. For instance, if a feature is present at the morphosyntactic interface, it should also be present at the point of transfer. Now, certain features may be assumed to be present at the morphosyntactic interface but not in the phonetic externalisation, namely the features of reduced or deleted segments. From what we have said, these features must be present throughout the Narrow Phonology, and therefore accessible to the Agree operation. Any operation deleting these features must apply in the mapping from Narrow Phonology to the interface with the externalisation system. What we predict, then, is that processes of deletion and reduction should not have an effect on phonological phenomena involving Agree, since at the level where Agree operates, these processes cannot have applied. Conversely, we predict Agree must have applied by the point at which the deletion of features takes place. In other words, deletion must counterfeed or counterbleed agreement, whereas agreement must feed or bleed deletion.

In this paper, I will examine various interactions between these two processes, an example of a process which supports an analysis and discussion of several of those which would seem to constitute exceptions to it. It will be shown that often those examples which run counter to the prediction are often more fruitfully analysed as involving processes other than deletion or agreement.

2 Opaque Agreement in Newar

As was mentioned above, we predict that where deletion and agreement interact, deletion should counterbleed or counterfeed agreement. Examples of this

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3 We are assuming, with Chomsky (2001), that uninterpretable features enter the derivation unvalued.

are relatively easily found – I will discuss two instances of a counterbleeding relationship in the Newar language, which is a Tibeto-Burman language spoken Nepal's Kathmandu Valley[4]. In this language, absolutive forms of native (or nativised) words never end in consonants, but frequently end in long vowels or diphthongs. When a vowel-initial case suffix is attached to the stem, however, the vowel becomes short (or the second component of a diphthong is deleted) and a lexically specified consonant emerges. A number of examples are shown below.

(2)   *Locative and Ergative Case in Newar*

Gloss	Absolutive	Locative	Ergative
'water'	lə:	ləkʰe:	ləkʰə̃:
'store'	ḍuku:	ḍukuti:	ḍukutĩ:
'roof'	pəu	pəli:	pəlĩː
'paper'	pəu	pəti:	pətĩ:
'language'	ḅae	–	ḅasə̃:
'moustache'	gwae	gwatʃe:	gwatʃə̃:
'son'	kae	–	kajə̃:
'value'	ḅa:	ḅawe:	–
'thorn'	kə̃:	kə̃tʰe:	kə̃tʰə̃:
'opinion'	bitʃa:	bitʃare:	–

Since the emerging consonants are apparently determined by the lexicon rather than by any phonological conditions, we must take them to be present in the lexical form of the word, and therefore that they must remain throughout the Narrow Phonology. This is confirmed by the fact that we see minimal pairs contrasting the consonant in question. We may consider the second half of long vowels in the absolutive as an instance of agreement: the agreement is usually total, and so we can assume that the vowel involved is entirely composed of uninterpretable features, meaning that the features of the vowel are absent from the lexical form. We do not always see total agreement, however: we see two diphthongs in the examples above, namely [əu] and [ae]. The former does not seem to involve any agreement at all, and so I will not discuss it at this point. In the latter, on the other hand, the second half of the diphthong does seem to bear some features in common with the preceding vowel, and, upon inspection, is found to only occur where the emerging consonants are [tʃ], [j] or [s], which could plausibly be argued to form a natural class of palatal
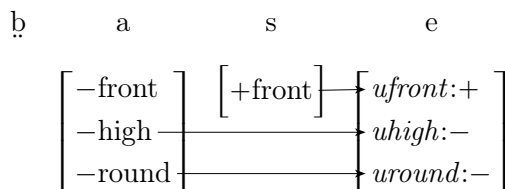
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4 The data here is derived from my personal knowledge of the language, but confirmed using Śreṣṭhācārya and and Tulādhar's trilingual Newar dictionary.

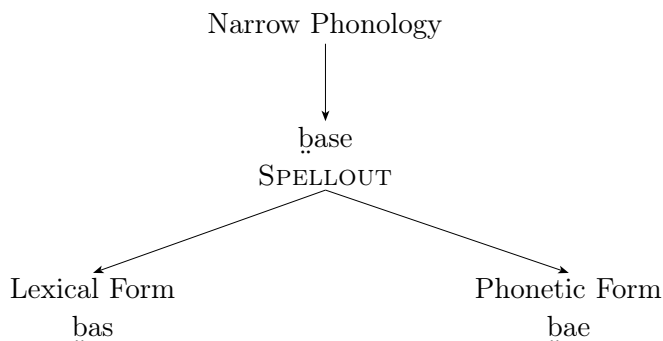consonants [5] , perhaps containing a feature [+front].

It seems, then, that the final vowel in the citation form is partially harmonising with the underlying consonant, by acquiring its [+front] feature, even though the consonant does not appear at the surface[6]. In Newar, then, deletion counterbleeds agreement. The processes involved are shown below:

(3)   *Agreement and Deletion Processes in Newar*

    (a) *Agreement Relations*[7]

$$
\underset{\text{b}}{ } \qquad \text{a} \qquad \text{s} \qquad \text{e}
$$

$$
\begin{bmatrix} -\text{front} \\ -\text{high} \\ -\text{round} \end{bmatrix} \begin{bmatrix} +\text{front} \end{bmatrix} \begin{bmatrix} ufront{:}+ \\ uhigh{:}- \\ uround{:}- \end{bmatrix}
$$

    (b) *Deletion in Mapping to Interfaces*

Narrow Phonology

$\downarrow$

base
Spellout

Lexical Form   Phonetic Form
bas   bae

In fact, another opaque agreement process can be seen in (2) - as can be seen, the locative and ergative, while usually realised as *-eː* and *-ə̃ː* respectively, have alternative forms *-iː* and *-ĩː* when they are suffixed to stems ending in a final high vowel. We can straightfowardly analyse this as a harmony process and state that these suffixes have an uninterpretable height feature, which agrees with the immediately preceding vowel. But this occurs even when the

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5 A third palatal consonant, [ʥ] also appears in this position, but is extremely rare and I have no examples of it emerging from the diphthong [ae]. This should not be taken to be anything more than an accidental gap, however.

6 Except for the process of deletion, this phenomenon is essentially identical to a similar effect in Barra Gaelic vowel copy, as discussed by Sagey (1987) (cited by Halle, Vaux and Wolfe (2000) and Nevins (2010), *inter alia*).

7 [−front] consonants do not seem to intervene in this way. Nevins (2010) notes that non-contrastive and unmarked features frequently seem not to act as interveners – an intuitive explanation for this is that they are underspecified in the narrow phonology, although this is not an explanation Nevins adopts.

vowel in question is not present at the surface. The final *realised* vowel in the locative of words such as *pəu* 'roof' is [ə], a nonhigh vowel, but we still see the high alternant of the suffix. The obvious trigger for this is the lexical final vowel [u], and so it must remain at the point where Agree occurs. As a parenthetic note, we observe that the fact that lexical vowels may cause deletion should convince us that it is not the non-lexical nature of the vowel in examples like (3) that triggers deletion, as might have been thought, but rather the structural relationship between the final vowel and the consonant. This configuration is also the configuration which permits agreement – ordinarily vowels in Newar do not agree with their associated onsets. This observation will be important later on.

3   Transparent Agreement

3.1   *Nasal Assimilation in Chukchi*

As stated above, our framework predicts that we should only find deletion counterfeeding or counterbleeding agreement. However, we do find apparent instances of other relationships, where deletion feeds or bleeds agreement. An example of deletion apparently feeding agreement can be found in Chukchi, in a process discussed by Odden (1994). In Chukchi, oral stops assimilate to immediately following nasals. This is true even if the two consonants are adjacent only because of deletion of an intervening vowel. Some examples are shown below:
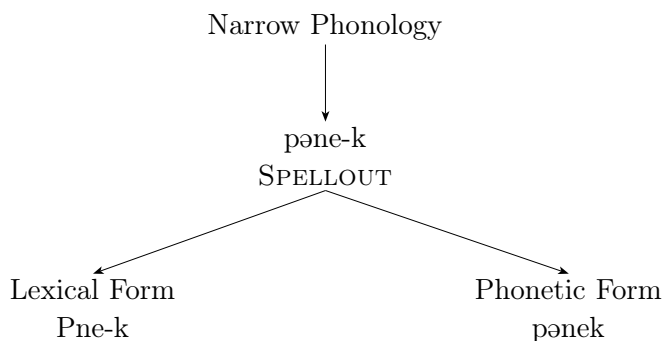
(4) *Chukchi nasal assimilation* (Odden 1994:301-302)

pəne-*k*	'to grind'	ɣe-**mne**-*lin*	'it ground'
rəpən	'flesh side of hide'	**rəmn**-*ət*	'flesh sides of hides'
pəŋəl	'news'	ɣa-**mŋət**-*len*	'having news'
təm-*ək*	'to kill'	ɣa-**nmə**-*len*	'he killed'
rətən	'tooth'	**rənn**-*ət*	'teeth'
təŋe-*k*	'to grow'	ɣe-**nŋe**-*lin*	'it grew'

It would seem that the deletion of the vowel in these words feeds the agreement between the two consonants. However, there is an alternative analysis. It will be noted that in all of the examples above the deleted vowel is a schwa. A schwa is the prototypical unmarked vowel, and, as with the totally agreeing vowel in Newar, we might assume that all of its features are unspecified at the lexical level, and that they are filled in by default when the output of the narrow phonology is mapped to the phonetic interface. Indeed, Nevins' Agree relation already provides for a default insertion of feature values when a search
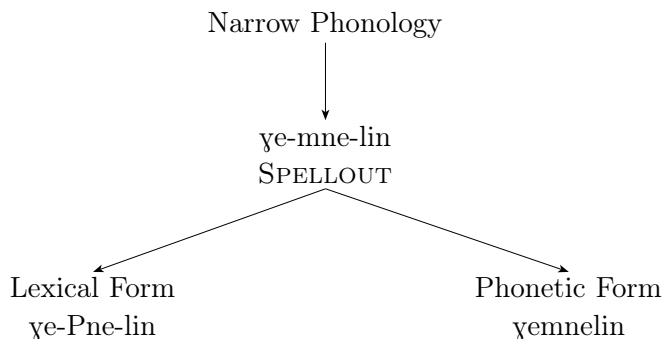
for an appropriate goal fails[8]. If this is the case, then a schwa does not need to be inserted in order for the output of the Narrow Phonology to map to the morphosyntactic interface unproblematically, as long as this is permitted by the conditions imposed by the externalisation system.

(5)   *Mapping to Interfaces in Chukchi*[9]

   (a) *With Schwa*

<div align="center">

Narrow Phonology

↓

pəne-k
Spellout

Lexical Form ← → Phonetic Form
Pne-k   pənek

</div>

   (b) *Without Schwa*

<div align="center">

Narrow Phonology

↓

ɣe-mne-lin
Spellout

Lexical Form ← → Phonetic Form
ɣe-Pne-lin   ɣemnelin

</div>

The figures in (5) may require some further elucidation. In the lexical form, the initial consonant is not specified for any particular nasality value. Nor does the root ever possess any features corresponding to the vowel intervening between the two consonants. In (5a) conditions at the externalisation interface demand the insertion of a vowel, so a vowel consisting entirely of uninterpretable features is inserted. This vowel intervenes between the initial consonant of the root and the following nasal, and so the initial consonant is not able to value its uninterpretable nasal feature. Both the features of the vowel and the nasality feature of the initial consonant are inserted by default.

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8 For examples of an equivalent process in syntax, see Preminger (2009, 2011).
9 Here capital letters indicate a segment unspecified for some feature.

In (5b), the vowel is not inserted, which makes no difference to the lexical form but removes the intervention effect preventing the root-initial consonant from valuing its nasal feature.

The account above is not only permitted by our framework, but it also has greater explanatory value than one involving deletion, as it easily accounts for why the vowel elided in this context is invariably schwa rather than any other vowel[10].

3.2   More Newar Harmony

Other examples of deletion apparently both feeding and bleeding agreement can be found in Newar. A number of examples were omitted from (2), especially those involving nasals, but also a subclass of those involving palatals. Examples are shown below:

(6)   *Nasals, Palatals and Case in Newar*

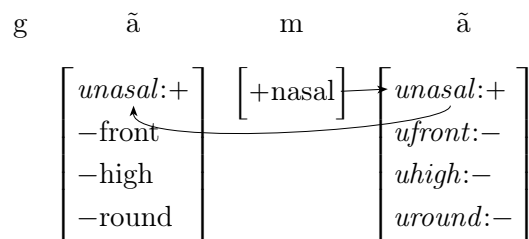| Gloss	Absolutive	Locative	Ergative
'shirt'	lə̃ː	ləneː	lənə̃ː
'village'	gãː	gameː	gamə̃ː
'devil, demon'	lakʰeː	–	lakʰəsə̃ː
'air'	pʰeː	pʰəseː	pʰəsə̃ː

Now, we have said that the consonant in the absolutive examples is deleted, while it is retained in the locative and ergative. It will be noted that in the instances where it is deleted, the lexical vowel gains a feature from the deleted consonant - nasality or frontness. Where the consonant is retained, on the other hand, no such feature surfaces. It might seem, then, that the deletion process is feeding some sort of harmony to the deleted vowel. Again, however, this is not the only possible explanation. We can account for this process not as agreement with the deleted consonant, but with the final, agreeing vowel - that is, with the *trigger* of the deletion. Since deletion occurs only when this vowel is present, such agreement would be indistinguishable from agreement fed by deletion.

Essentially, the explanation proceeds as follows: the final vowel (composed entirely of uninterpretable features) agrees with the relevant features of the

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10 This Chukchi data, where epenthesis bleeds an agreement process, can be contrasted with New Julfa Armenian (Vaux 1998), where a similar process of epenthesis *counterbleeds* assimilation for laryngeal features. This is not problematic for us, however – although our analysis demands that certain apparent deletion processes in a transparent relationship with AGREE be analysed as epenthesis, there is nothing that demands that epenthesis block agreement in all circumstances.

associated consonant (ie. either frontness or nasality). The initial, lexical vowel is subsequently introduced into the derivation, at which point the final vowel values its remaining uninterpretable features. If the lexical vowel itself has an uninterpretable feature, then that feature is valued on the basis of the value possessed by the final vowel. The initial vowel *never* agrees with the onset, but the agreeing vowel renders some of its features visible. That this operation does not apply when the consonant remains is due to the fact that the agreeing vowel, which triggers deletion, is not inserted. As in Chukchi, we have reduced a process apparently triggered by deletion to one which is conditioned by insertion. This is shown diagramatically below:

(7)   *Agreement processes in* g$\tilde{\text{a}}$: *'village'*

$$
\text{g} \qquad \tilde{\text{a}} \qquad\qquad \text{m} \qquad\qquad \tilde{\text{a}}
$$

$$
\begin{bmatrix} unasal\text{:}+ \\ -\text{front} \\ -\text{high} \\ -\text{round} \end{bmatrix} \quad \begin{bmatrix} +\text{nasal} \end{bmatrix} \longrightarrow \begin{bmatrix} unasal\text{:}+ \\ ufront\text{:}- \\ uhigh\text{:}- \\ uround\text{:}- \end{bmatrix}
$$

To explain why this account is independently preferable, we must consider yet another process which at first sight sits uneasily with our theory, this time the apparent bleeding of an agreement process by deletion. In Newar, the glides [j] and [w] often intervene between a consonant and a following vowel. If the vowel they precede is a lexical schwa then it is generally realised as [e] or [o], depending on the glide in question. Again, this is a prime candidate for analysis in terms of agreement: we can say that schwa has an uninterpretable [front] feature and an uninterpretable [round] feature, which agree with an appropriate goal if one can be found. However, in the absolutive case of words similar as the above, this process fails to take place: when the consonant is deleted, the vowel fails to agree with the preceding glide. If the consonant surfaces then agreement applies as usual. Relevant examples are shown below:

(8)   *Glides and Agreement*

Gloss	Absolutive	Locative	Ergative
'god'	djəː	–	djelə̃ː
'hole'	hwəː	hwoleː	–
'crow'	kwəː	–	kwokʰə̃ː
'feast'	b̥weː	b̥woʥeː	–
'betel nut'	gweː	gwoʧeː	gwoʧə̃ː
'head'	ʧʰjə̃ː	ʧʰjeneː	ʧʰjenə̃ː

Now, the context in which the initial vowel apparently agrees with the deleted consonant is exactly the same as that in which it fails to agree with the preceding glide, and indeed many of the examples in (8) show both phenomena. In fact, if we assume an analysis in which the initial vowel agrees with the final one, we have an explanation for both of these facts – the reason that the vowel fails to agree with the glide is because it preferentially agrees with the following vowel, which also stands in agreement relation to the relevant onset. For this to fully explain all of the examples in (8), we do need to make a few additional assumptions: The first assumption is that the final vowel is in some sense structurally closer to the initial one than to the glide. Clearly, if we are wishing to identify the operations of Narrow Phonology with corresponding operations in syntax, this is not problematic. Although the linear distance is greater (or at least the same, in the surface realisation), distance in structures constructed by MERGE are standardly assumed not to depend on the linearisation. The second assumption is that vowels present some sort of boundary to agreement, thereby preventing the final vowel from being able to value its uninterpretable features from a (structurally) more distant segment. This is a desirable condition: it explains why most consonants are not accessible for agreement (they lie in the domain of some other vowel), and also provides a explanation of why non-harmonising vowels cross-linguistically are frequently opaque. Our final assumption concerns the behaviour of uninterpretable features when there is no possibility of AGREE valuing them in the normal way. For our explanation to work, they must be valued by default as soon as the domain within which their features could potentially be valued is complete – unless our final vowel has the relevant features filled in by default as soon as it becomes necessary, it will be impossible for the initial vowel to contract an AGREE relation and value its own uninterpretable features from them. With these assumptions[11], we are able to account for all of the Newar data with a

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11 Of these assumptions, the first is straightfoward consequence of our framework, the second is desirable for empirical coverage, and the third, by making assertions about the crosslinguistically active (and presumably universal) operation of AGREE, is independently falsifiable.

single process which conforms to our prediction.

3.3   Karok Palatalisation

Our final apparent exception is the case of palatalisation in Karok (Bright 1957, Kenstowicz and Kisseberth 1977, 1979). In Karok, front vowels to the left of a sibilant induce palatalisation in that consonant if there are no other vowels intervening. There is also a deletion process in the language whereby certain vowel-final prefixes trigger deletion of an initial vowel. This process would seem to feed or bleed the agreement process, depending on the prefix in question. Consider the following examples, for instance:

(9)   *Karok Palatalisation and Deletion* (Bright 1957, Kenstowicz and Kisseberth 1979)

Root	Derived Form
suprih 'to measure'	*ni-ʃuprih* 'I measure'
siːtvah 'to steal'	*ni-ʃiːtvah* 'I steal'
iʃpuka 'money'	*mu-spuka* 'his money'
iʃkak 'to jump'	*ʔu-skak* 'he jumps'
apsiːh 'leg'	*nani-pʃiːh* 'my leg'

This example does indeed seem problematic for our analysis. We see the deletion process both feeding and bleeding agreement – and because we see more than one vowel here, this cannot simply be analysed as epenthesis as in Chukchi. The agreement process certainly must be analysed as Narrow Phonological in our framework, because it is conditioned by the lexical effects (recalling that we have assumed that the point of spellout is the only point at which phonology has access to the lexicon). For instance, we see lexical exceptions to the palatalisation rule, especially in borrowings, in words such as *sikspitʃ* 'six bits', *keːks* 'cake', but also in native words such as *ʔutasinsir* 'he brushed it repeatedly' (Bright 1957:17).

There is evidence, however, to suggest that the process of deletion should not be analysed as a phonological process, but as a morphological one, applying before the Narrow Phonology interfaces with the morphosyntax. First of all, the process of deletion is not the regular process which applies to adjacent vowels, but is morphologically conditioned, applying only to prefixes, and only a subset of those[12]. A plausible analysis might propose that the

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Making them is therefore not problematic, although further investigation should test whether the third does indeed hold.

12 The regular process involves a coalescence of the relevant vowels, resulting in a long vowel. For example, *ikri + iʃ → ikriːʃ* 'sit-down', *ivya + iʃ → ivyeːʃ* 'pour-down', *pa + iʃpuka →*

prefixes in question select an allomorph of the root which does not possess the initial vowel, thereby explaining why these prefixes do not engage in the usual phonological process which results from hiatus. In fact, there is some independent support for the existence of such forms. Bright notes that, in isolation, words beginning with a short vowel and two consonants (of which all of our vowel initial words are examples) may appear without the initial vowel – we see *akvaːt* 'raccoon' realised as *kvaːt*, for instance, or *iʃpuka* 'money' realised as *ʃpuk*.

If this process is indeed morphological, rather than phonological, then there is no problem for our analysis – in the condition with no vowel, the Narrow Phonological derivation once again simply never inserts one, since the output of the morphosyntax which is being targeted lacks a vowel. Agreement processes occur as normal, accounting for the data we see in (9). In Karok, as in Chukchi and Newar, these transparent relationships are not a result of deletion, but of a failure of insertion.

4   CONCLUSION

In this paper I have examined a number of phenomena involving an interaction between deletion and agreement, with a view to testing the strongest framework of homology between phonology and syntax, which only admits certain orderings of these processes. In the examples which have been discussed it has been found that apparent exceptions to the orderings have preferable alternative explanations. Of course, this is by no means conclusive – these reanalyses certainly do not prove that this assumption of homology is a correct analysis, but they do perhaps offer some plausible evidence beyond simple conceptual desirability. What this paper provides is the possibility of testing whether weakening this hypothesis is necessary, and it is hoped that this will be accomplished through further work on a wider range of data.

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peːʃpuka 'the-money' (Bright 1957)

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J. Joseph Perry
Department of Theoretical & Applied Linguistics
Faculty of Modern and Medieval Languages
Sidgwick Avenue
Cambridge, CB3 9DA

jjp45@cam.ac.uk