

THE REALITY OF SAPIR'S PSYCHOLOGICAL REALITY OF THE PHONEME

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1. INTRODUCTION¹

What worries me most about phonemic representations of the type advocated by Sapir (1933) and the systematic phonemic representation of Transformational Generative Grammar (e.g. Chomsky 1964) is not their shape at an abstract level but rather the seemingly arbitrary choice – from very many alternatives (as a look at a dialect atlas or a stylistic analysis will show) – of the surface forms to which such abstract representations are said to be related. These surface forms differ from lect to lect, variation being located along the temporal social, geographic and stylistic axes.² Picking the standardised word-list pronunciation style of adult male middle class speakers as the endpoint of the journey from psychologically real deep structures to surface structures to me seems a very dubious way of going about the job that phonologists should be doing, namely accounting for the fact that speakers speaking many different varieties of a language can communicate with one another. Time prevents me from dealing further with this point here and those interested in the argument are referred to Bailey (e.g. 1973 and 1977).

Since many linguists continue to believe that it is the nature of the deep structure that is crucial to the process of evaluating phonological solutions I would like to restrict my discussion to some problems in this area. In particular, I would like to dismantle a notion which has become almost a dogma and is presented as such to most beginning students of phonology: That Sapir (1933) has provided unassailable evidence for the psychological reality of the phoneme. The following two quotations concerning this point are representative of many:

The classic article on the psychological reality of phonemes is Sapir's (1933) article bearing exactly this title. In this article Sapir reports the following anecdote:

When working on the Southern Paiute language of southwestern Arizona I spent a little time trying to teach my native interpreter ... how to write his language phonetically ... I selected *pa:ʒah* ... I instructed Tony to divide the word into its syllables and to discover by careful hearing what sounds entered into the composition of each of the syllables ... To my astonishment Tony then syllabified *pa:*, pause, *pah*. I say "astonishment" because

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I at once recognized the paradox that Tony was not "hearing" in terms of the actual sounds (the voiced bilabial β was objectively very different from the initial stop) but in terms of an etymological reconstruction: *pa*: 'water' plus postposition **-pah* 'at'. The slight pause which intervened after the stem was enough to divert Tony from the phonetically proper form of the postposition to a theoretically real but actually nonexistent form. (pp.23-24).

What this means is that Tony had knowledge of the underlying /p/ in the postposition 'at', which by rule becomes the voice spirant [β] intervocalically. In other words, the /p/ in the phonemic representation is psychologically real.

(Hyman 1973:73-74)

But now, the modern student will ask, what evidence can we have about these 'feelings'? Surely all we can know is what the native speaker tells us; and surely his 'feelings', in so far as they are conscious, may be conditioned by quite irrelevant factors (most obviously, in the case of a literate speaker, orthographic convention), and in so far as they are not conscious, are not directly accessible to the linguist. We cannot base analyses on such an insecure foundation.

In a later paper (1933), Sapir seeks to provide some independent evidence of the reality of his 'sound patterns' and of the phoneme in the sense in which he used the term (not the classical sense). He assumes that

if the phonemic attitude is more basic, psychologically speaking, than the more strictly phonetic one, it should be possible to detect it in the unguarded speech judgements of native speakers who have a complete control of their language in a practical sense but have not rationalized or consciously systematic knowledge of it. 'Errors' of analysis ... may be expected to occur which have the characteristic of being phonetically unsound or inconsistent but which at the same time register a feeling for what is phonemically accurate.

Sapir goes on to give several examples, not all of which are entirely cogent. One, however, is very strong indeed; in fact when Twaddell (1935) was trying to abolish the evidence for 'the phoneme [in any sense] as a mental or psychological reality', he was unable to find a satisfactory counter-argument to this example.

(Sommerstein 1977:6)

2. SAPIR'S 'PSYCHOLOGICAL REALITY'

It would seem necessary to say a few more words about the circumstances that led Sapir to his views on phonological representations. It will have to be a rather sketchy discussion and those interested in fuller details are referred to Sapir's original writings (in particular 1933 and 1925) and subsequent discussions by Twadell (1935) and McCawley (1967).

In trying to find evidence for the psychological reality of 'phonemes' (in Sapir's sense), Sapir argues:

If the phonemic attitude is more basic, psychologically speaking, than the more exactly phonetic one, it should be possible to detect it in the unguarded speech judgments of naive speakers who have a complete control of their language in a practical sense but have no rationalized or consciously systematic knowledge of it. "Errors" of analysis, or what the sophisticated onlooker is liable to consider such, may be expected to occur which have the characteristic of being phonetically unsound or inconsistent but which at the same time register a feeling for what is phonemically accurate. Such "errors", generally overlooked by the practical field linguist, may constitute viable evidence for the dynamic reality of the phonemic structure of the language.

His work in the area of reducing American Indian languages to writing with the help of native informants strengthened his belief that phonemes are indeed psychologically real:

I have come to the practical realization that what the naive speaker hears is not phonetic elements but phonemes. The problem reaches the stage of a practical test when one wishes to teach an intelligent native, say one who can read and write English reasonably well and has some intellectual curiosity besides, how to write his own language. The difficulty of such a task varies, of course, with the intelligence of the native and the intrinsic difficulty of his language, but it varies also with the "phonemic intuitiveness" of the teacher. Many well-meaning linguists have had disappointing experiences in this regard with quite intelligent natives without ever suspecting that the trouble lay, not with the native, but with themselves. It is exceedingly difficult, if not impossible, to teach a native to take account of purely mechanical phonetic variations which have no phonemic reality for him. The teacher who comes prepared with a gamut of absolute phonetic possibilities and who unconsciously, in spite of all his training, tends to project the phonemic valuations of his own language into what he hears and records of the exotic one may easily befuddle a native. The native realizes when what he is taught "clicks" with what his phonological intuitions have already taught him; but he is made uncomfortable when purely phonetic distinctions are pointed out to him which seem real enough when he focuses his attention on them but which are always fading out of his consciousness because their objective reality is not confirmed by these intuitions.

Sapir, in his 1933 article, presents a number of results of such 'practical tests' (strictly speaking we are dealing with pretheoretical observations rather than theory testing). One example has already been given above. Another, equally famous one is:

When working on Sarcee, an Athabaskan language of Alberta, Canada, I was concerned with the problem of deciding whether certain words that seemed homonymous were actually so or differed in some subtle phonetic respect that was not immediately

obvious. One such homonymous, or apparently homonymous, pair of words was *diní* "this one" and *diní* "it makes a sound". In the early stage of our work I asked my interpreter, John Whitney, whether the two words sounded alike to him and he answered without hesitation that they were quite different. This statement, however, did not prove that he was objectively correct, as it is possible for perfectly homonymous words to give the speaker the illusion of phonetic difference because they appear or because of the different positions they occupy in their respective form systems. When I asked him what the difference was, he found it difficult to say, and the more often he pronounced the words over to himself the more confused he became as to their phonetic difference. Yet all the time he seemed perfectly sure that there was a difference ... The one tangible suggestion that he himself made was obviously incorrect, namely, that the *-ní* of "it makes a sound" ended in a "t". John claimed that he "felt a t" in the syllable, yet when he tested it over and over to himself, he had to admit that he could neither hear a "t" nor feel his tongue articulating one. We had to give up the problem, and I silently concluded that there simply was no phonetic difference between the words and that John was trying to convince himself there was one merely because they were so different in grammatical form and function that he felt there ought to be a difference.

I did not then know enough about Sarcee phonology to understand the mysterious "t" theory. Later on it developed that there are phonologically distinct types of final vowels in Sarcee: smooth or simple vowels; and vowels with a consonantal latency, i.e., vowels originally followed by a consonant which disappears in the absolute form of the word but which reappears when the word has a suffix beginning with a vowel or which makes its former presence felt in other sandhi phenomena. One of these disappearing consonants is *-t'*, of which *-'* may be considered a weakened form.

3. SOME REACTIONS TO SAPIR'S PROPOSALS

Later writers, depending on whether they favoured a behaviourist or a mentalist view of language, held varying opinions of the validity of such 'tests'. A particularly critical reaction is that of Twaddell (1935).

3.1 He first criticises Sapir for selectively extracting those data which support his hypothesis and withholding others. Thus, with regard to the *paβa* case he observes.

Sapir's guide, whom he describes as a 'young man of average intelligence', surprised him by writing a voiced labial fricative as [p], although objectively of course this [β] differs more from the initial [p] than does the postvocalic long or short stop [p', p]. We are not told how Tony wrote these latter sounds; if he wrote them, too, as [p], then his procedure is a simple case of uniform response to different

stimuli. If Tony wrote the postvocalic stop with a different symbol, then there might be some basis for stating 'that the postvocalic -β- is more closely related functionally to a simple initial -p than is the postvocalic -p- (after unvoiced vowel), which must always be interpreted as a secondary form of -p-' (50). But this statement would be strictly inconsistent with Sapir's report.

(Twaddell 1935:58)

3.2 For the *dini* example Twaddell (*ibidem*) points out that Sapir confuses phonological and morphological criteria, or, expressed in a more modern jargon, that he fails to distinguish between natural phonological processes and acquired lexico-morphological ones:

(2) John Whitney, another native interpreter, assured Sapir that the two Sarsi words, *dini* 'this' and *dini* 'it makes a sound', apparently homonyms, were totally different. John insisted that the second of these words ended in [t]. As Sapir tells us, both final vowels are aspirated; the increment of aspiration to a vowel may be a positional variant of [t], or it may a feature of utterance-conclusion. In the one case John analyzed the aspiration as a [t]-variant, the other as a finality-feature. The reason for the native speaker's choice of mode of analysis is, Sapir indicates, the occurrence of morphological variants of *dini* 'it makes a sound' which contain an unambiguous [t]. In so far as this incident may be interpreted as evidence of any mental reality, it would appear to be rather a morphological class or lexical unit than any phonetic or quasi-phonetic class or unit.

Chomsky (1964), on the other hand, appears prepared to attach considerably more importance to Sapir's findings. After introducing the term 'systematic phonemic representation' he states that:

"The level of systematic phonemics is essentially the 'phonological orthography' of Sapir".

McCawley (1967), without rejecting Sapir's general claims regarding the psychological reality of abstract structures, points out that some of Sapir's assumptions are in conflict with transformational generative phonology, in particular the constraint that the phonological inventory be a subset of the phonetic inventory and the use of undivided sound segments rather than phonological features. The reader is left with the impression that Sapir's phonology stands in need of some minor updating rather than a drastic revision.

McCawley does not mention a third point implied by Sapir, namely that tests of the type described in his article have come to be regarded as a kind of discovery procedure by fieldworkers concerned with reducing unwritten languages to a written form. I have been told by fieldworkers who have tried it that they soon began to feel that they were either more stupid or unluckier than Sapir. The reasons for this together with certain other flaws in Sapir's argument, will be discussed now.

4. MORE DATA ON DEVELOPING WRITING SYSTEMS

Important questions such as that of the psychological reality of phonemes, should be settled by extensive and systematic observation of a broad array of data rather than on the basis of a well-chosen selection of anecdotes. In addition, evidence from naturally occurring data would seem to be preferable to the elicitation of responses in an artificial fieldworker-informant tête-à-tête.³

My own data consists of letters written in non-standardised Tok Pisin between 1970 and 1976. The writers of these letters are comparable to Sapir's 'intelligent natives' in that many of them have had some instruction in English. One difference is that data from both female and male informants were considered. Most of the letters considered were written to the editor of *Wantok*, the largest Tok Pisin newspaper.

As there is no single phonological system for Tok Pisin, I expected, and encountered, a great deal of interindividual variation. It would be interesting to pursue the question of how speakers of this language cope with the numerous competing pronunciations and spellings.

An unexpected result of my data analysis was the extent of intra-individual variation. Far from coming up with consistent solutions, letter writers appeared to explore many strategies of sound representation in single short texts, ranging from letter pronunciation spellings and quasi-phonetic spellings to more abstract and anglicised ones.⁴ The solutions in almost all instances were a far cry from Sapir's 'phonological orthography'.

Let us now look at some of the data:

4.1 Spelling of words containing syllable final [ŋ] as in [siŋ siŋ] *to dance* [loŋ loŋ] *crazy* or [loŋ] 'locative preposition'.

A number of variant pronunciations of these words should be noted:

- (a) Some speakers add a homorganic voiced stop either word finally or both medially and finally, as in: [siŋ siŋŋ] and [siŋsiŋŋ].
- (b) The added final stop is occasionally devoiced as in [siŋsiŋk].
- (c) Many speakers neutralise nasals in syllable-final position, i.e. no distinction is made between spelled *sin* *sin* and *sing* *sing*. We can therefore represent *singsing* as /siŋsiŋ/.
- (d) Some varieties of Tok Pisin prenasalise voiced stops, as in [rendi] *redi* = *ready*, or [tambak] *tabak* *tobacco*. Here prenasalisation is non-phonemic and *singsing* could be written /sigsig/.⁵
- (e) Convention (b) (devoicing) can also combine with (d) resulting a representation /siksik/.

(Forms in heavy typescript represent standard orthography (Mihalic 1971)).

It should be noted that the above alternatives are realised differently in different lexical items, since processes of lexical diffusion appear to play a greater role in pidgins than in first-language vernaculars.⁶ This means that the most reliable evidence will come from variant spellings of one and the same form.

Consider, for instance, the variant spelling of the items long 'preposition' *tingting* *think* and *singsing* *dance* in a single letter:

tigtig	singsing	log
tingting	sinsig	lok
tintin		

The writer of another letter represents tingting as both tinktink and tingting, whilst yet another writer has the forms isingaut and isinkaut *is shouting*, in the same short letter.

4.2 Spelling of words containing epenthetic vowels, as in karanki *cranky* or sukul *school*.

The insertion of epenthetic vowels is obligatory for many older speakers of the language, whilst younger and first-language speakers only use it as a stylistic variant (cf. Pawley 1975 and Wurm, Mühlhäusler and Laycock forthcoming). In some words, epenthetic vowels are a partly lexical phenomenon, being favoured in forms such as sapos *if* and supia *spear* but not in spesel *special* and gris *fat, grease*. There are no clearcut examples of epenthetic vowels functioning in a meaning-distinguishing way.

One would therefore expect 'intelligent natives' to ignore epenthetic vowels in their phonological orthography. This, however, is not always the case and, in addition, the same writer will sometimes use a quasi-phonetic and sometimes a phonological writing system.

Consider the following examples from one letter:

STANDARD WRITTEN FORM	PHONETIC REPRESENTATION	ACTUAL WRITTEN FORM	GLOSS
sampela	[sampela] ⁷	sambla	<i>some</i>
dispela	[dispela]	dispela	<i>this</i>
yangpela	[yanpela] ⁷	yangpela	<i>young</i>
kru	[kuru]	kru	<i>brain</i>
krungutim	[kurungutim]	kurugitim	<i>to bend</i>

Another writer produced both martim and maritim *to marry* in the same letter. Many examples of similar inconsistencies (i.e. when measured against Sapir's orthography) could be pointed out with epenthetic vowels.

4.3 Spelling of words containing prenasalisation of (voiced) stops.

Prenasalisation is lexicalised in some instances (i.e. it is favoured in tambu *taboo* but disfavoured in oda *to order*) and appears to be rapidly disappearing in the first-language varieties of Tok Pisin (cf. Tetaga 1971). I do not know any variety of Tok Pisin where prenasalisation is phonemic.

Some remarks on this feature were already made in my discussion of [ŋ]. As has been the case with other sounds, prenasalisation is not represented consistently in the letters examined. The same writer came up, for instance, with the spellings karagi and karangi for standard kranki *cranky*. In another letter we find both planti *plenty* and iapela for [yanpela] *young*.⁸

The above examples could be multiplied for each of the cases examined, and similar material could be presented for word-initial [h], final stops, and vowels. It would seem that the phenomena observed are very different from Sapir's findings. To me they represent negative support for a level of phonological spellings and they further seem to disconfirm Sapir's generalisation that "it is impossible to teach a native to take account of purely mechanical phonetic variations which have no phonemic reality for him".⁹

4.4 Morphophonemic representations.

We have been concerned so far with the psychological reality of purely phonological underlying forms. A second type discussed by Sapir are morphophonemic (morphological) segments such as the ones in the *dini* example above. Again, data obtained from an examination of Tok Pisin letters suggests that such segments too are not represented with any consistency.

For many speakers, final voiceless stops are neutralised in pronunciation. Thus, underlying /t/ can be variably pronounced [k], [p] or [ʔ]. Many intransitive verbs or adjectives end in a voiceless stop.¹⁰ The underlying stop consonant can be recovered when the transitiviser *-im* is added to the verb stem, as in *marit - maritim to marry - to marry someone* or *stop - stopim to stop - to stop someone*.

In spite of the high frequency of the transitive forms, quite a few letter writers fail to represent the correct underlying consonant in the case of the intransitive forms. Thus, in a single letter we find the following three spellings for underlying /t/, only one of them morphophonemically 'correct':

RECORDED SPELLING	CORRESPONDING TRANSITIVE FORM	GLOSS
marik	maritim	<i>to marry</i>
stret	stretim	<i>to straighten</i>
orai	oraitim	<i>to correct</i>

This data seems to suggest that sound correspondences for which there is no natural phonological explanation can also lay no claim to psychological reality. Again, the spellings suggest that speakers of Tok Pisin are well aware of what Sapir would refer to as 'subphonemic differences'.¹¹

5. EVIDENCE FROM TOK PISIN BACKSLANG

A description of this special register of Tok Pisin can be found in Aufinger (1949). According to this author, backslang developed as a by-product of literacy in Tok Pisin. The discovery that words could be written backwards led to their being spoken backwards. Most speakers use backslang only with individual words, particularly those with taboo content, e.g. *pekpek to defecate* becomes *kepkep* and *puspus to have sexual intercourse* *supsup*.

The Tok Pisin word for *school* is usually spelt *skul* and pronounced [sukul] with a non-phonemic epenthetic vowel. The epenthetic vowel is compulsory in initial *sk* clusters for most speakers but less likely in final *ks* clusters such as in *neks next* or *siks six*.¹²

Thus, the expected backslang form of both standard spelling and phonemic spelling is /luks/. The actual documented form is *lukus* with the subphonemic epenthetic *u* in the final cluster.

I have not carried out any detailed investigation of Tok Pisin backslang, but I feel that a closer examination of this register both in Tok Pisin and other languages could yield valuable evidence for phonological analysis.

6. DISCUSSION

I feel that the data presented here leave little doubt that Sapir's phonological spelling, and derived systems such as SPE phonology will have to be drastically revised before they can make any claims to being mentalist in the sense of reflecting psychological reality. My data are therefore yet another confirmation of Botha (1971).

My only reason for flogging a dead horse yet again is the importance which continues to be attached to Sapir's evidence. Far from deserving such attention, it would seem that the most charitable interpretation of Sapir's tests is that, by some stroke of luck, he happened to get hold of totally consistent 'monomaniacal' superinformants. However, I feel inclined to suspect that the artificial context¹³ in which such informants' intuitions were obtained is responsible for the results.

In real life situations, speakers of language have at their disposal a number of different strategies to arrive at plausible spellings. The strategies used by adult speakers of Tok Pisin are comparable to those underlying the creative spelling of young children discussed, for instance, by Read (1980).

Most important, speakers appear to be quite capable of hearing and representing subphonemic differences, though the extent to which they are able to do this remains to be determined.

Instead of being discouraged by the many 'inconsistencies' in developing spelling systems, linguists should regard them as valuable evidence for both the language users' creativity and the linguistic variability of natural languages.

I am not sure to what extent data from developing spelling systems can shed light on abstract phonological representations. If they can be legitimately used then we are forced to admit that what is directly observable is only indirectly related to more abstract representations via a number of natural rules.¹⁴ The stages intermediate between abstract representations and actual surface forms would seem to be part of a speaker's knowledge and are hence likely to appear in creative spelling.

It is important to distinguish between spellings representing natural phonological processes and others reflecting cultural (taught) knowledge of varying kinds. Among the latter, knowledge of other writing systems (in our case English and vernaculars), letter pronunciations and the degree of exposure to standardised written language are of particular importance.

Natural phonological processes must also be kept separate from morphological alternations. Such alternations are real only in as much as they reflect something which has been taught and learnt.

In conclusion, I would like to make the following points (I am afraid that many of them will be old familiars to you):

- (1) The testing of informants' intuitions in a formal interview context must be supplemented with evidence from spontaneously produced natural language.
- (2) The fact that spelling systems reflect many stages in the phonological representation of a form may be taken as additional justification for the postulation of a single phonetological (in the Baileyian sense) component of grammar.
- (3) An adequate linguistic theory must account for the fact that writers of natural languages are capable of producing and interpreting variable output.

- (4) Natural and 'nurtural' processes must be kept separate in phonological explanations.
- (5) Sapir was right in drawing our attention to abstract knowledge of native speakers – he was wrong in locating such knowledge at a single (phonemic) level of analysis.

Those of you concerned with the development of actual writing systems may find in this paper some explanations of why they failed to achieve (as they undoubtedly have done) the neat consistent solutions that Sapir managed to obtain.

I hope that future writers of introductory textbooks to phonology will be a little more reluctant to create false expectations about the nature of language encountered in everyday situations.

NOTES

1. I would like to thank Dr. D.C. Laycock and Dr. D.T. Tryon of the Department of Linguistics, Research School of Pacific Studies, of the Australian National University and Professor M. Silverstein, University of Chicago for helpful comments and suggestions on the first draft of this paper as well as my wife Jackie for editorial help and comments.
2. Such variation is also found in Tok Pisin. Although most of its speakers use it as a second language for many of them it has become their primary language. A number of the variants which developed along the geographical and social demensions are now used for stylistic purposes by fluent speakers.
3. Interesting additional evidence could come from an examination of indigenous scripts. Examples are found for a number of Austronesian languages, though none is documented for Tok Pisin.
4. As pointed out to me by Dr D.T. Tryon, any attempt at spelling is a move towards standardisation of a language, i.e. speakers attempt to write lento rather than allegro pronunciations. The fluctuations found with semi-established spelling systems such as encountered for Tok Pisin may be partly due to the speakers' exposure to different semi-official standards, though it must be noted that many of the spellings found in the letters examined are not part of any such spelling system.
5. For interesting remarks on the treatment of prenasalisation by speakers of Tolai (Tok Pisin's principal substratum language) see Mosel (1980:11).
6. One of the reasons for this is the pressure of Tok Pisin's lexifier language English. It accounts for a great deal of upward style-shifting.
7. The forms listed here represent lento pronunciation. In allegro style we find [sambala] and [yambala]. None of the letter writers represented such assimilations orthographically, however.
8. Some speakers contrast [ŋg] and [ŋk] as in tangir [taŋgir] *mackerel* against manki [maŋki] *young boy*, though there are no minimal pairs.
9. These findings agree with those actively involved in designing standard orthographies, e.g. Phillips (1976:47):

It is felt that the Prague and Bloomfieldian type of analysis used to arrive at the original phonemes of Wahgi, and consequently their symbolization in the orthography, by not taking note of degrees of function in a context larger than the word as described here, and the relevance of minimal pairs from within a word class, tends to ferret out all the phonic contrasts establishable on the word level within the language, and attribute to them a rank of importance which is not shared by the native speakers, and consequently to overload the language with signalling entities in the alphabet.

10. The status of final stops is much more difficult to test with nouns. A speaker of Tok Pisin who has no knowledge of English may represent in both written and spoken form, 'night' as *naip* and knife as *nait*. All standard orthographies involve heavy reliance on etymological criteria.
11. Dr D.C. Laycock, in Wurm, Mühlhäusler & Laycock (forthcoming) has suggested that we are dealing with a gradient phenomenon here, related partly to intra-linguistic knowledge, partly to the knowledge of other linguistic system. It is worthwhile to quote his observations regarding the Buin language:

... subphonemic differences in articulation tend to have no verbal characterisation, and may be impervious to imitation, or even be unperceived. In Buin, older speakers have a consistent allophony between [t] and [s] – the former occurring always before /e/ and /o/, and usually before /a/ and /u/, and the latter occurring always before /i/, and occasionally before /u/ (and very rarely before /a/). Younger speakers, however, have learnt to make a distinction between the /t/ and /s/ phonemes of the lingua franca New Guinea Pidgin, and will now make such statements as 'speakers of the north-east dialect call their dialect Uisai, but we say Uitai'. I am not sure that older speakers of Buin are in a position to make such a statement, since for them the allophony is, in all dialects other than that of Uisai, fairly strictly conditioned.

The perceptual threshold is even more striking in the case of the [r] and [l] allophones of Buin /r/. Younger speakers of Buin are aware that /r/ and /l/ contrast in New Guinea Pidgin, but even so very few are able to make the distinction. It is a fact, readily apparent to a Western observer, that speakers of both the northern and the southern dialects of Buin use the [l] allophone more frequently (in initial position) than do speakers of the central dialect (where [r] predominates). But since r and l are in free variation in all dialects, speakers of any dialect may not even be aware of the difference in frequency of realisation of the allophones and, even if aware of it, may not be able to consistently make the distinction themselves. I have heard Buin speakers attempt such utterances as 'mountain people say loi (for *man*), while we say roi' – but the utterance comes out as 'mountain people say loi, while we say loi', or 'mountain people say roi, while we say roi', or even 'mountain people say roi, while we say loi' (which last is at total variance with the facts).

It would seem imperative to gather similar observations for many other languages since they promise to yield significant insights into the question of the psychological reality of underlying representations. It should be noted that Laycock's data reveal a significant difference between perception and production.

12. This statement is an oversimplification. The epenthetic vowel in final clusters is very common in words such as bokis *box*, takis *tax* and akis *axe*. It is almost categorically absent in meso-lectal Tok Pisin after plural -s as in [bʊks] *books* or [tʌɪts] *tights* and is often dropped in 'anglicised' pronunciation. We appear to be dealing with a complex case of lexical diffusion and grammatical conditioning of phonological rules. As the stress in the item under discussion falls on the last syllable [sʊkʌl'], the most favoured backslang pronunciation would seem to be [lʊks].
13. Similar artificial test mar the discussion of psychological reality in Phillips (1976).
14. It is interesting to observe that some natural rules (e.g. assimilation of consonants) appear to be less readily reflected in developing writing systems than others (e.g. devoicing of final stops).

APPENDIX

1) Variable spelling of [ŋ] syllable and word-finally:

11

Singel MAN IVA MARIT MAN
 dea-edita MI WAN PELA BOI Bilog ~~PA~~
 MADANG NAMI WOK LOK Eligi IV ERIG LOG
 PORT MORESBY TASOL MI Louki m dis PELA
 Wan TOK LESTA em iorait TASOL PALANTI
 TAN MOA igat dis PELA kain TigTig TASOL
 PALANTI MAN MOA INO gat dis PELA kain
 TIN TASOL mi Tig MAN Singel NA MERI
 Singel em iorait Bilog RAUN LOG PATI
 2. SINSIS Na Man igat T.O.L.O. L.O.
 TA. PELA PIKINI em ol SEM WANEN PAI
 130 LUKI SINSIS O PATI em MAN MAS ISTH
 i MAN iklin go RAUN LOG LAIK Bilog LA
 MERI em Bilog Hous BOG INO KAP
 RAUN LOG PATI O SINSIS
 PALANTI MAN igat dis PELA kain TigTig
 MI PAL MAN MOA INO gat TingTing
 em TASOL MI BELLE. D.

2) Variable spelling of epenthetic vowels:

Yes Ga Tumun Ating yu gat Karangi tingting long head
 silang yu. Martim ol mastai na Samding bilong Kantri.
 go het. Sepas yumi ol Man na Meri i WOK wantaim
 ting baibai Kantri bilong yumi i ge het
 Yu ting Wenem, yu inap winim mani long Pomuk na
 Martim ol Mastai. Plis ating yu gat Rapis tingting long
 head bilong yu.

3) Variable spelling of word-initial [h] and medial [ŋ]:

Na Wewak Island Council. Long Wewak/Nonem!
 Mifela Island na bigples i bain Takis
 Wankain. Na taim mifela Island isingaut
 long alpin bilong Cansil. Na ol no kalpin
 guik, bigples ol isingaut Na koutu ol i alpin.
 Olesem na mi laik bai mifela i mast
 brukim bai mifela iken bain Takis long
 Cansil bilong mifela stret na ol i bain
 long ol yet. Taim bilong Cenral miting
 local ol iken laina long Wewak Cansil

4) Variable representation of underlying morphophonemic /t/:

yes mi saue lukim planti ol isipla mini long
 Papua o na mew Gusa o i saue i go mekin
 hin. Behain em i hat wanpela pal ol bolon
 mau em bainbai em imekim ^{tu} ken long
 mana na papa bilong em. Behain
 ken em i laik mauit long wanpela
 man-pambai em tek ye work Sen
 Car tasol. Taim em i sitaw dekem
 wan lain bilong em i kem i go roun
 em Awe Aitem na sani long ken.
 man yupea ol meni mas tekenk
 gut postin erai ye den mekin
 pasim olesem. yupea tikeing
 olesem wunen long tipela Sonting
 mi tink em in no street long mi.

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