THE INFLUENCE OF PROSODIC PATTERNS UPON THE MUTUAL INTELLIGIBILITY OF ABORIGINAL AND GENERAL AUSTRALIAN ENGLISH

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0.0 ABSTRACT

Representative samples of conversational discourse in Aboriginal English, General Australian English, and an Aboriginal vernacular are compared by auditory and acoustic analysis. Lack of complete mutual intelligibility between Aboriginal and General Australian English is found to be due to differences in their repertory of prosodic signal contrasts, and in the ways in which this repertory is exploited in communication. The similarities and differences in prosodic patterns between these two varieties of English are explained by comparison with the Aboriginal vernacular. Rate of articulation and duration are shown to have an important effect upon the perception of pitch and intensity variation patterns.

1.0 THE AIM OF THIS ARTICLE IS:

(a) To study the relationship of prosodic to grammatical and lexical features in the L (familiar) form of Aboriginal English and in the familiar style of General Australian English, to discover why these two speech varieties are partially lacking in mutual intelligibility.

(b) To compare the prosodic features of the L form of Aboriginal English with those of a selected Aboriginal vernacular.

2.0 Previous studies, using mainly auditory analysis, have described separately the salient phonological, grammatical, and lexical features of the Aboriginal English L form spoken in different localities. Though they have agreed in assigning the primary cause of its lack of intelligibility to special characteristics of its prosodic patterns,
they have not shown how these are interrelated with its grammatical and lexical system.

The present study uses both instrumental and auditory analysis to investigate the problem of intelligibility in relation to the total linguistic system of the Aboriginal English L form.

2.1 Representative samples (henceforward referred to as AbAE, GAE, and AbV) of recorded conversations in Aboriginal Australian English, General Australian English, and an Aboriginal vernacular, similar in length, content, and style were selected from a corpus. AbAE and GAE were each spoken by a group of four informants (14-16 years), AbV by two informants (60+ and 30+ years). The conversations, consisting mainly of spontaneous anecdotes and reminiscences, took place in the absence of the linguist. The speech of the informants, who were chosen at random from a larger group, showed idiolectal variation.

2.2 AbV was in Idindji, which belongs to the Atherton Pama Sub-group of the Pama-Maric Group, in the Pama-Nyungar family of languages. Capell (1956) noted the general phonological homogeneity, despite variations, of the Australian Aboriginal vernaculars. The phonology of AbV may be taken as sufficiently representative of other vernaculars in the area from which the AbAE informants were chosen.

2.3 AbAE belongs to the middle of the continuum of "Aboriginal English," a term which designates a range of local and stylistic varieties in communities throughout Queensland. The local varieties are mutually intelligible. They are most alike in phonology, but exhibit minor grammatical and lexical differences. The stylistic varieties exist in a 'diglossia' situation in each community. They form a continuum between an L form phonologically more influenced by Aboriginal vernacular contact and an H form closer to the familiar form of General Australian English. The range of variation is smaller with older informants from remote areas than with younger informants, but it does still exist.

This is shown by material collected in a far north-western Queensland community in 1968, from informants aged over 60, who are all immigrants from the Northern Territory and are bilingual speakers of Karawa or Janjula. Their L form (which they themselves call "broken English") has distinctive local grammatical characteristics, and is furthest, of all the Aboriginal L forms, from GAE: it possesses
pronominal forms, e.g., yupela (you all, multiple plural), and yu tupela (you two, dual plural), which are not found in other Queensland Aboriginal L forms. They are however found in the texts and vocabulary of New Guinea Highlands Pidgin recorded by Wurm. The north-western Aboriginal English L form is however otherwise very different grammatically and lexically from the New Guinea Highlands Pidgin, and also from the Sepik variety recorded by Laycock.

Despite these grammatical differences, this older group of Aboriginal informants can so adjust stylistically towards an English H form as to be able to communicate intelligibly enough with non-Aboriginal listeners. They are mutually intelligible to younger Aboriginal speakers in the same community. Phonologically their speech is very similar to AbAE.

3.0 The procedure adopted in studying the data was to make an auditory analysis of length, pitch, and stress (relative contrastive syllable loudness); an acoustic analysis of rate of articulation, syllable duration, fundamental frequency, and intensity, using a machine giving a simultaneous display of these, and a grammatical and lexical analysis of relevant features (this last for AbAE and GAE only).

These analyses sought to discover what variations in the acoustic signals produce contrastive auditory prosodic signals, and which, out of this repertory of contrastive signals, are communicatively important, in being related to the grammatical and lexical pattern and thus to intelligibility. Not all variations in the acoustic signals produce contrastive auditory signals: some produce non-contrastive signals, and some are so small that they produce signals which are not perceived in the fast continuous stream of speech in actual communication, though they may be discriminated by careful repetitive listening.

3.1 The following acoustic features were observed:

(a) Syllable duration; range of variation in this; average syllable duration for each sample and each speaker.

(b) Rate of articulation (in syllables per second, pauses being omitted from the time span); range of variation in this; average rate, for each sample and each speaker.

(c) Fundamental frequency occurring at each syllable; number of intersyllabic frequency changes; percentage of syllables in each sample between which frequency changes occur, in order to determine to what extent frequency variation forms the basis of
the auditory signal repertory;\textsuperscript{10} the percentages of frequency changes affecting contrastive pitch variations (determined by comparison with the auditory analysis as 2+ semitones), of those affecting non-contrastive variations (1-2 semitones), and of those affecting non-perceived variations (1- semitone); maximum speaking pitch range; and intrasyllabic frequency variation (where this occurs, in longer syllables).

(d) Intensity level of each syllable; number of intersyllabic intensity changes; percentage of syllables in each sample between which intensity changes occur, in order to determine to what extent intensity variation forms the basis of the auditory signal repertory; the percentages of intensity changes affecting contrastive differences in stress, and of those (3- db) affecting non-contrastive differences; and the percentages of syllables in each sample between which variations between three intensity ranges occur: R1-R3 (effecting strong-weak auditory stress contrasts); R1-R2 (effecting strong-medium stress contrasts); and R2-R3 (effecting medium-weak stress contrasts).

The data thus obtained provided a basis for quantitative\textsuperscript{11} comparative statements concerning the signal repertoires of AbAE, GAE, and AbV.

4.0 The following is a description of the acoustic basis of the prosodic signals in the three samples:

4.1.1 Average rate of articulation and average syllable duration

<table>
<thead>
<tr>
<th></th>
<th>GAE</th>
<th>AbV</th>
<th>AbAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. rate (syllables per sec.)</td>
<td>5.6</td>
<td>6.5</td>
<td>7.6</td>
</tr>
<tr>
<td>Av. duration (sec.)</td>
<td>.18</td>
<td>.15</td>
<td>.13</td>
</tr>
</tbody>
</table>

Thus GAE has a comparatively slow and AbAE a comparatively fast rate of articulation, while AbV is intermediate between the two. Consequently GAE syllables have relatively long, and AbAE syllables relatively short, average duration, with AbV intermediate between the two.
4.1.2 Rate of articulation varies continually according to the characteristics of the segmental phones, syllable patterning, discourse style (e.g., narrative or discussion), the emotional attitude of the speakers, and their idiolectal characteristics:

Comparative ranges of variation in rate of articulation: utterance to utterance

<table>
<thead>
<tr>
<th></th>
<th>Syllables per sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAE</td>
<td></td>
</tr>
<tr>
<td>Speaker B (male)</td>
<td>2.9-6.3</td>
</tr>
<tr>
<td>Speaker D (female)</td>
<td>4.0-8.3</td>
</tr>
<tr>
<td>AbAE</td>
<td></td>
</tr>
<tr>
<td>Speaker A (male)</td>
<td>6.2-7.6</td>
</tr>
<tr>
<td>Speaker D (male)</td>
<td>6.8-10.6</td>
</tr>
<tr>
<td>AbV</td>
<td></td>
</tr>
<tr>
<td>Speaker A (male)</td>
<td>3.1-9.2</td>
</tr>
</tbody>
</table>

4.1.3 Comparative ranges of variation in syllable duration, and distribution of long and short syllables within these ranges

<table>
<thead>
<tr>
<th></th>
<th>Longest syllable</th>
<th>Shortest syllable</th>
<th>Ranges of variation: duration of syllables, % of total occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.25+ sec.</td>
<td>.10-.24 sec.</td>
<td>.09- sec.</td>
</tr>
<tr>
<td>GAE</td>
<td>.56 sec.</td>
<td>.05 sec.</td>
<td>16.3%</td>
</tr>
<tr>
<td>AbV</td>
<td>.40 sec.</td>
<td>.05 sec.</td>
<td>16.3%</td>
</tr>
<tr>
<td>AbAE</td>
<td>.37 sec.</td>
<td>.04 sec.</td>
<td>8.6%</td>
</tr>
</tbody>
</table>

AbAE differs from GAE in having fewer long syllables (.25+ sec.) and more very short syllables (.09- sec.). AbV is not significantly different from GAE in the distribution of long and short syllables.

AbAE and AbV differ from GAE in having shorter maximum syllable duration. All three however do not differ significantly in the percentage of their syllables which fall in the medium range (.10-.24 sec.) or in the duration of their shortest syllable. 12

4.2.1 Intersyllabic frequency changes:

The following chart shows the percentage of syllables in each sample between which frequency changes (FC) occur; the percentage of frequency changes effecting contrastive pitch variation (CFC), of those effecting non-constrastive variations (Non-CFC), and of those effecting non-perceived variations (Non-PFC); and maximum speaking pitch ranges.
### 4.2.2 The above analysis shows that:

(a) Intersyllabic frequency changes occur more often in AbAE than in GAE and AbV.

(b) (i) The percentage of intersyllabic frequency changes affecting contrastive pitch variations is significantly greater in AbV and AbAE than in GAE.

(ii) The percentage of those affecting non-contrastive variations is least in AbAE, greatest in GAE, with AbV intermediate between the two.

(iii) The percentage of those affecting non-perceived variations is greatest in AbAE, less in GAE, and negligible in AbV.

These facts, taken together, indicate that intersyllabic frequency changes are more important in the acoustic basis of the prosodic signal repertory of AbAE, and also of AbV, than in that of GAE.

(c) Maximum speaking pitch range is greatest in AbV, and less in AbAE and GAE.

(d) AbV differs from AbAE and GAE in three ways:

(i) The very small percentage of frequency changes affecting non-perceived pitch variations (1.4%). Frequency rises and falls are sharp: the instrumental display shows frequency curves with steep slopes.
(ii) The predominance of intersyllabic frequency falls over rises. This is related to the characteristic pitch movement contour of declarative AbV utterances: a pitch peak usually occurs near the beginning, followed by a generally falling contour. It may also be related to the grammatical word structure of AbV: a pitch peak co-occurs with the root syllable, with a progressive fall on the suffixes.

(iii) The wide speaking pitch range, with a characteristic intrasyllabic, as well as intersyllabic, pitch movement: within key syllables of emphatic or emotive utterances, sharp rises from high to very high pitch levels occur. The instrumental display here shows perpendicular rises and falls of perceptible duration at the peaks of the frequency curves.

AbAE does not resemble AbV in the above characteristics, but rather resembles GAE. The percentage of frequency changes effecting non-perceived pitch variations is comparable with that of GAE. Both AbAE and GAE show no significant predominance of frequency falls over rises, or rises over falls. Frequency changes in both are more gradual than in AbV. One reason for this is that AbAE resembles GAE rather than AbV in its syntax and word structure. Fewer bound morpheme suffixes occur in AbAE even than in GAE.

However, AbAE resembles AbV and differs from GAE in the importance of frequency changes in the acoustic basis of its signal repertory.

These similarities and differences illustrate one aspect of the influence of AbV on AbAE.

(e) Speaking pitch range varies greatly. It is influenced by discourse style, the nature of the content and the requirements of logical emphasis, and the emotional attitude of the speakers.

4.3.1 Intersyllabic intensity changes

The following chart shows the percentage of syllables in each sample between which intensity changes (IC) occur, including those effecting contrastive differences (CIC) and those effecting non-contrastive differences (Non-CIC) in stress; and the percentages of syllables in each sample between which R1-R3, R1-R2, and R2-R3 intensity variations occur.
<table>
<thead>
<tr>
<th></th>
<th>% of total number of syllables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total IC</td>
</tr>
<tr>
<td><strong>GAE</strong></td>
<td>86.5</td>
</tr>
<tr>
<td><strong>AbAE</strong></td>
<td>78.9</td>
</tr>
<tr>
<td><strong>AbV</strong></td>
<td>82.4 Falls 60.4 Rises 22</td>
</tr>
</tbody>
</table>

4.3.2 The above analysis shows that:

(a) Intensity changes occur more often in GAE than in AbAE and AbV.

(b) The percentage of intensity changes effecting contrastive differences in stress is significantly greater in GAE than in AbAE and AbV.

(c) The percentages of R1-R3 and R1-R2 intensity changes is greater in GAE than in AbAE and AbV. R1-R3 (corresponding to strong-weak auditory stress) and R1-R2 (corresponding to strong-medium auditory stress contrast) intensity variations are communicatively more important than R2-R3 variations, in communicative utterances generally.

These facts, taken together, indicate that intersyllabic intensity changes are more important in the acoustic basis of the GAE prosodic signal repertory than in that of AbAE or of AbV.

4.4.0 Prosodic patterns accompany and help to mark grammatical-lexical patterns in spoken communication, and are therefore partly determined by them. The following is a statement of grammatical similarities and differences between AbAE and GAE which are relevant to the study of their prosodic patterns.13
4.4.1 Relative frequency of occurrence of grammatical units in utterance structure:

(a) Sentence and sentence groups

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sentences (% of total sentence occurrences)</td>
<td></td>
<td>Sentence groups (% of total sentence and sentence group occurrences)</td>
</tr>
<tr>
<td></td>
<td>Clausal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simple</td>
<td>Complex</td>
<td>Co-ordinate</td>
</tr>
<tr>
<td>AbAE</td>
<td>76.6</td>
<td>13.4</td>
<td>10</td>
</tr>
<tr>
<td>GAE</td>
<td>47.2</td>
<td>19.4</td>
<td>8.4</td>
</tr>
</tbody>
</table>

The above analysis shows that:

(i) Simple clausal sentences occur much more frequently, but complex sentences less frequently in AbAE than in GAE. The occurrence of co-ordinate sentences is approximately the same.

(ii) Sentence groups occur more frequently in AbAE than in GAE. The predominance of simple sentences and the rarity of complex sentences in AbAE help to explain this. The utterance structure of AbAE is similar to that of an Aboriginal vernacular described by Capell.14

(iii) Non-clausal sentences do not occur in AbAE.15

Differences in utterance prosodic patterns result from these notable differences in utterance grammatical structure.

(b) Group and phrase units

(i) AbAE differs from GAE in the relative frequency of occurrence of the three structural types of group units - premodifier-head-postmodifier (MHQ), premodifier-head (MH), and head-postmodifier (HQ):
The predominance of \textit{MH} and the absence of \textit{MHQ} structures in \textit{AbAE} means a notable difference from \textit{GAE} in accompanying prosodic patterns. Moreover, the exponent of the \textit{M} element of \textit{MH} structures in \textit{AbAE} is most frequently a short deictic or article, adjectives being rare; whereas both deictics and adjectives occur as exponents of secondary elements of premodifier structure in \textit{GAE} group units.

(ii) \textit{AbAE} differs from \textit{GAE} in a greater frequency of occurrence of phrase units, and in a different distribution of nominal, adjectival, adverbial, and verbal grammatical classes of group and phrase units:

<table>
<thead>
<tr>
<th></th>
<th>% of total occurrences of group and phrase units</th>
<th>% of total occurrences of group units</th>
<th>% of total occurrences of phrase units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(G)</td>
<td>(P)</td>
<td>(G_{\text{nom}}) (G_{\text{adj}}) (G_{\text{adv}}) (G_{\text{v}}) (p_{\text{adv}}) (p_{\text{adj}})</td>
</tr>
<tr>
<td>\textit{AbAE}</td>
<td>55.6</td>
<td>44.4</td>
<td>72</td>
</tr>
<tr>
<td>\textit{GAE}</td>
<td>77.7</td>
<td>22.3</td>
<td>60.7</td>
</tr>
</tbody>
</table>

These grammatical differences all have a bearing upon the prosodic patterns accompanying clause and sentence.

(c) \textit{Word units}

\textit{AbAE} differs from \textit{GAE} in word-structure and in the distribution of grammatical word-classes. It does not differ significantly from it in the distribution of monosyllabic, disyllabic, and trisyllabic words.
(i) Word-Structure

<table>
<thead>
<tr>
<th>% of total number of word occurrences</th>
<th>Simple Words</th>
<th>Complex Words</th>
<th>Compound Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>AbAE</td>
<td>91.3</td>
<td>7.3</td>
<td>1.4</td>
</tr>
<tr>
<td>GAE</td>
<td>83.3</td>
<td>12.3</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Though simple words predominate in both AbAE and GAE, the frequency of occurrence of simple words is significantly higher, and that of complex and compound words significantly lower in AbAE than in GAE.

(ii) Distribution of grammatical word-classes

<table>
<thead>
<tr>
<th>% of total word-class occurrences</th>
<th>Nominal</th>
<th>Verbal</th>
<th>Adjectival</th>
<th>Adverbial</th>
</tr>
</thead>
<tbody>
<tr>
<td>AbAE</td>
<td>31.2</td>
<td>47.3</td>
<td>4.3</td>
<td>17.2</td>
</tr>
<tr>
<td>GAE</td>
<td>39.1</td>
<td>39.1</td>
<td>13.3</td>
<td>8.5</td>
</tr>
</tbody>
</table>

The rarity of adjectives affects group premodifier structure, and therefore group prosodic patterns. 16

(iii) Distribution of one-, two-, three-, and four-syllable words

<table>
<thead>
<tr>
<th>% of total word occurrences</th>
<th>1-syllable</th>
<th>2-syllable</th>
<th>3-syllable</th>
<th>4-syllable</th>
</tr>
</thead>
<tbody>
<tr>
<td>AbAE</td>
<td>80</td>
<td>15.9</td>
<td>4.1</td>
<td>0</td>
</tr>
<tr>
<td>GAE</td>
<td>82.4</td>
<td>14.4</td>
<td>2.1</td>
<td>1.1</td>
</tr>
</tbody>
</table>
4.4.2 The relative frequency of occurrence of function words and 'lexical' words does not differ significantly in AbAE and GAE. Bound morphemes occur much less frequently in AbAE than in GAE, because simple words occur more frequently.

<table>
<thead>
<tr>
<th></th>
<th>% of total word occurrences</th>
<th>% of lexical words having bound morphemes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Function words</td>
<td>Lexical words</td>
</tr>
<tr>
<td>AbAE</td>
<td>56.6</td>
<td>43.4</td>
</tr>
<tr>
<td>GAE</td>
<td>57.9</td>
<td>42.1</td>
</tr>
</tbody>
</table>

5.1 Two generalizations emerge from the above analysis:

(a) AbAE and GAE both resemble and differ from one another in their prosodic signal repertory. AbAE sometimes resembles GAE where it differs from AbV, e.g., in exploiting contrastive pitch rises as well as falls. On the other hand, AbAE sometimes resembles AbV where it differs from GAE, e.g., in the greater functional load carried by pitch contrasts.

(b) The prosodic patterns of both AbAE and GAE are influenced by certain of their grammatical and lexical characteristics.

5.2 AbAE and GAE also resemble and differ from one another in the ways in which the prosodic signal repertory of each is exploited communicatively, in co-ordination with grammatical-lexical patterning, in helping to mark sentence, clause, group/phrase, and word grammatical units; in signalling logical emphasis or modal contrasts; and in carrying part of the relationship signalling load carried in the sentences of written language by grammatical signals (e.g., function words and bound morphemes):

(a) Prosodic markings of grammatical units: acoustic basis of prominence patterns

(i) Declarative utterance-medial sentences in continuous speech in AbAE normally have a general falling-rising subject-predicate prominence pattern: a fall occurs from the exponent of the subject to that of the predicate (verbal) element, and a rise occurs thence to the exponent of the final structural element of the sentence. In GAE utterance-medial sentences, however, the normal pattern is a
general subject-predicate rise (with minor fluctuations) from the exponent of the subject to that of the predicator, and thence to the exponent of the final structural element of the sentence.

The following examples show intersyllabic and intrasyllabic pitch rises and falls (Prf), in semitones; intensity range variations (IRV); and syllable duration (SD), in seconds.

**Simple sentences**

**AbAE** /wi kam daun da il/

Prf  f2.8 r2.8 f2.8 r1.9 r1.9 (f1.9 terminal)
IRV  R1 R3 R1 R2 R1
SD   .09 .13 .10 .05 .15

The example shows a contrastive pitch and intensity fall from subject to verb, and a sentence pattern with initial and final pitch and intensity peaks.

The fall-rise pattern accompanying AbAE sentence and clause units seems to to represent a compromise between the general falling pattern of AbV, and the general rising pattern of GAE, sentences. The difference of pattern from GAE, and the fast rate of articulation, hinder the intelligibility of AbAE sentences for the GAE listener.

**GAE** /wi wOst a sou last naIt/

Prf  r5 f1.8 f3.1 r3.8 r4.8 r.9 f1.8 (terminal)
IRV  R3 R1 R2 R1 R2 R1 (falling)
SD   .07 .30 .13 .23 .17 .23

The sentence finishes on a higher pitch than it began, although there are intermediate falls as well as rises. Intensity and duration variations here correspond with pitch variations.
(ii) Subordinate clauses in complex sentences

AbAE /wen ai ad mai lesanz ei ai gana go plei gelm/

Prf f1.8 f1.2 f.9 f1.8 f2 r7.7 f3.9 f6.2 level r1.2 r3.2 f4.4
IRV R1 R1 R1 R1 R3 R2 R3 R3 R3 R3 R2
SD .10 .07 .20 .07 .20 .13 .10 .20 .13 .15 .17 .17

This example shows a fall-rise pattern in the subordinate clause, with a rise at the end, and a subject-predicate fall in both clauses. Prominence peaks are marked by pitch contrasts. Intensity contrasts, and duration contrasts (except for the very short /ai/ and /mai/), are generally lacking.

GAE /wen dei put de neil em av de film on wi kudnt si it/

Prf r1.2 r4.1 f1.9 r8.3 f10.5 level r13.8 f7.7 f3.9 r1 f4.1 r7.1 r8.2
IRV R3 R2 R3 R3 R1 R3 R1 R3 R2 R1 R2
SD .14 .16 .15 .07 .33 .08 .10 .32 .17 .07 .27 .12 .12

Generally rising subject-predicate prominence patterns are evident here, but terminal falls mark the end of each. The definitive contrastive signal is pitch variation, but intensity and duration changes sometimes support pitch contrasts.

(iii) Group units

AbAE groups resemble GAE groups in prosodic pattern where, as rarely happens, they have adjective premodifiers:

AbAE /da lal dei/

Prf f7 f7 f2.2 f2.2 (terminal)
IRV R3 R1 R2 R2
SD .17 .13 .12 .12

GAE /de rounded konaz/

Prf r1.2 level f5 f1.8
IRV R2 R1 R3 R1 R3
SD .08 .15 .12 .17 .10
MHQ groups in GAE usually show a decrease of prominence from head to postmodifier, unless the latter carries a sequence signal. MHQ groups do not occur in AbAE.

(iv) Phrase units

AbAE utterance-medial phrases usually have a falling-rising, or falling, prosodic pattern, whereas GAE utterance-medial phrases usually have a rising pattern:

<table>
<thead>
<tr>
<th>AbAE</th>
<th>/daun da il/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prf</td>
<td>f2.8</td>
</tr>
<tr>
<td>IRV</td>
<td>Rl 1.9 Rl 1.9 (f1.9 terminal)</td>
</tr>
<tr>
<td>SD</td>
<td>.10 .05 .15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AbAE</th>
<th>/laik dat/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prf</td>
<td>f2.8</td>
</tr>
<tr>
<td>IRV</td>
<td>Rl R2</td>
</tr>
<tr>
<td>SD</td>
<td>.23 .10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GAE</th>
<th>/m n m a l u l de/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prf</td>
<td>f1.9 r2 f2</td>
</tr>
<tr>
<td>IRV</td>
<td>R2 Rl Rl Rl</td>
</tr>
<tr>
<td>SD</td>
<td>.13 .20 .30 .10</td>
</tr>
</tbody>
</table>

This difference of phrase pattern particularly hinders mutual intelligibility at fast rate of articulation.

(v) Word units

AbAE resembles GAE in the relative prominence pattern of dissyllabic words:

<table>
<thead>
<tr>
<th>AbAE</th>
<th>/dina/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prf</td>
<td>f3.9</td>
</tr>
<tr>
<td>IRV</td>
<td>R1R2</td>
</tr>
<tr>
<td>SD</td>
<td>.08 .13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GAE</th>
<th>/ouvel/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prf</td>
<td>f10.4</td>
</tr>
<tr>
<td>IRV</td>
<td>R1R2</td>
</tr>
<tr>
<td>SD</td>
<td>.15 .12</td>
</tr>
</tbody>
</table>
AbAE differs from GAE in the pattern of trisyllabic compound words:

AbAE /lambarum/

Prf r1.8f.9r.9f.9(terminal)
f.9
IRV R1 R3 R1
SD .20.13.18

This word differs from the normal GAE pattern in the rising-falling (1.8-.9) pitch pattern of the prominent syllable /lam-/ . This is followed by a further fall on the second syllable /-ba-/ . The rising-falling pattern does not occur on similar syllables in GAE words:

GAE /tivitaimz/

Prf f3.2 r5 f3.9
IRV R1R2 R1-R2
SD .10.20 .28

(b) Emphasis and modal signals

Emphasis at phrase level is normally signalled in AbAE by a rising-falling, rising-falling pattern, intersyllabic in disyllabic words, intrasyllabic in monosyllabic words:

AbAE /veri ad/

Prf r2f4.9 r2.8r2f3.9
IRV R1 R2 R1-R2
SD .13.05 .27

Emphasis at phrase level in GAE is normally signalled by a falling-rising pitch pattern:

GAE [/it wez] sou fan i/

Prf f6.4 r3.9
IRV R1R2 R1R1
SD .28 .23.17
Intrasyllabic pitch variation often signals modal contrasts in non-clausal sentences in GAE. The frequent occurrence of non-clausal sentences, and of long and very long syllables necessary for the perception of intrasyllabic pitch contrasts, helps to explain this. The importance of considering duration in relation to pitch is here apparent. Long and very long syllables are rarer in AbAE, and non-clausal sentences do not occur; hence similar signalling of modal contrasts is not found:

GAE  /o  jes/  (declarative, assent)

Prf  f2  f2.4
IRV  R2R1  R1
SD  .23  .37

contrasts with:

GAE  /o  jes/  (dubitative, disagreement)

Prf  f7  f7  f7.9  f5.2
IRV  R2R1  R1
SD  .49  .56

The pitch range signalling the modal contrast is greater than that which marks the declarative utterance.

(c) Prosodic relationship signals

In GAE, function word and bound morpheme signals normally occur in the 'troughs' of the auditory prominence waves and are therefore not clearly audible, whereas the 'lexical' words, signalling the referents to be related, normally occur at the peaks. These peaks are heard in close temporal succession, and serve as a series of auditory cues: key referential words which are exponents of subject and predicate elements of sentence structure are meaningfully related by being heard in the same auditory prominence pattern, and not through the unclear grammatical relationship lexical signals. They are therefore associated by the listener with the observed relevant features of the situation and referred to his stored memory of language patterns.

This may be illustrated by reference to the GAE complex sentence example in 5.2 (a) (ii) above. The words /put/, /neim/, /film/, /kudnt/, /si/ occur at the auditory prominence peaks, the other words (function words such as pronouns, conjunctions, and
articles) in the 'troughs' of the successive prominence 'waves.'
The acoustic basis of auditory prominence is contrastive
variation in pitch (/\textit{put}/); in pitch, intensity, and duration
together (/\textit{neim/}, /\textit{film}/); in pitch and intensity (/\textit{si}/); or in
intensity and duration (/\textit{kudnt}/).

Pitch variation, it may be noted, is the only factor present
in all these contrasts, except the last.

The prominent words are separated by duration intervals of
only .07, .18, and .24 sec.

In AbAE, temporal collocation of prominence peaks occurs,
but this results in a sound signal pattern unfamiliar to the GAE
listener, since the prosodic patterns accompanying the grammatical
units are sometimes different. The rate of articulation is also
generally faster. This affects the perceived patterns, since
auditory perception depends, not only on pitch and intensity
values, but also on temporal proximity.

\begin{verbatim}
AbAE /wen\ ai\ go\ om\ ai\ gana\ raid\ da\ lidl\ kau/
Prf\ f2.9\ f1.9\ r1r1.8\ f1.8r5.7f8.8\ r7\ f7\ r8.8f8.8r4.1f1.9
IRV\ R1\ R1\ R1\ R3\ R2\ R2\ R1\ R3\ R1\ R1\ (falling)
SD\ .10\ .18\ .20\ .13\ .10\ .22\ .08\ .20\ .37
\end{verbatim}

The future auxiliary function word /gana/ has contrastively
lower pitch than the subject /ai/, and short duration. It is
separated by only .10 sec. from the preceding /go\ om/ and the
following /raid/, each of these being marked by a prosodic
prominence peak. The temporal conjunction /wen/ preceding /go\ om/
also has a pitch and intensity peak.

The quick temporal succession of these peaks provides suffi-
cient auditory cues for perceiving the grammatical relationship
of the lexical items, in association with the observed situational
context. The prosodic relationship patterns however differ from
those of GAE. The intrasyllabic pitch rise on /go/, followed by
a fall on /om/, forms the exact reverse of the normal pattern of
GAE. The fall from conjunction to pronominal subject (/\textit{wen ai/})
differs from the normal GAE pattern. The total communicative
effect of the utterance is therefore different.

6.1 The results of the above analysis, when considered together, point
to differences in total communicative pattern between AbAE, GAE, and
AbV.
Contrastive intersyllabic pitch variations occur more frequently in AbAE than contrastive intensity changes. The way in which pitch contrasts function communicatively in AbAE is related to its duration pattern and to its grammatical structure. AbAE has comparatively few long syllables and comparatively many very short syllables, these features being influenced by its fast rate of articulation. Intra-syllabic pitch contrasts, which require long syllables for their realization, are therefore comparatively rare. Pitch contrasts tend to function within larger segmental groupings than the syllable. This is also true of intensity variations: strong-weak loudness contrasts are rather between groupings of syllables, as in the AbAE sentence example in 5.2 (a) (ii), than between syllable and syllable. At the same time, grammatical word and group structure is comparatively simple, and signalling of relationships is predominantly through simple sentences in which class nominal and verbal units occur most frequently.

All this serves to constitute a total pattern in AbAE in which the larger components of the utterances are communicatively more important, and the sub-components, which tend to lose their identity in the larger components, are communicatively less important.

In GAE, however, the sub-components of the utterances are more clearly distinguishable in the signal pattern. Intra-syllabic pitch contrasts occur more frequently, since more long syllables occur and rate of articulation is slower. Contrastive variations in intensity occur more frequently than in AbAE and function communicatively in support of pitch contrasts: an auditory prominence peak is often marked by stress as well as pitch contrast. Communicative differences do not appear to be effected by length contrasts by themselves, but length has an important bearing on the perception of pitch contrasts. Word and group structure is more elaborate than in AbAE, and these units do not lose their identity in the larger patterns.

These differences in total communicative pattern serve to explain the partial lack of mutual intelligibility between AbAE and GAE.

AbV is again different. Long syllables and intra-syllabic pitch contrasts occur in AbV as in GAE, but the range of pitch variation is much greater and pitch contrasts consequently sharper. The predominantly falling pitch pattern of AbV utterances appears to be related to its grammatical structure.

6.2 Three points of general theoretical interest have emerged from the above description of the differences between AbAE and GAE, and of
the effect of these differences on mutual intelligibility. They are
the effect of rate of articulation on the perception of the temporally
successive contrastive rises and falls of pitch and intensity; the
fact that duration variations combine with pitch and intensity rises
and falls in the acoustic basis of the prosodic signalling system; and
the relation of prosodic to grammatical and lexical patterns in the
integrated signalling system of spoken language.
NOTES

1. Previous studies are discussed in my "Aboriginal English," English in Australia, No.6 (March 1968), p.6 and fn.8.


5. Specified in "Aboriginal English" (see fn.1, above), 6, 14-6, and 20, n.9.

6. Similar stylistic variation observed in India has been described by B.J. Kachru, "The Indianness in Indian English," Word, 21, 3 (December 1965), pp.393-4. The extreme popular form spoken there is not intelligible to the users of the educated form of English.


The identity of forms between this *AbAE L* form of Highlands Pidgin in New Guinea could have resulted from parallel independent developments in similar language contact conditions (numerous examples of this could be quoted), between English and different native vernaculars possessing dual plural forms; from contact between speakers of the *L* form and of the Pidgin; or from a genetic connection between the two, one form being derived from the other.


That this extreme *L* form was acquired from Pacific Islander ('Kanaka') labourer immigrants to Queensland is unlikely, from well-documented historical evidence (J.P.C. Sheppard, "The Pacific Islander in Queensland, 1863-1883," unp. M.A. thesis, University of Queensland, 1966, pp.1-142, *passim*). The following facts are relevant:

(a) The Islanders arrived late in Queensland (from 1863 onwards). An earlier arrival in New South Wales in 1847, was abortive, the small band soon either dying or returning home (Sheppard, pp.1-6).

(b) The Islanders despised the local Aborigines, were mostly hostile to them, and even fought them on occasions (Sheppard, pp.131-2). Extensive language contact is therefore unlikely.

(c) Initially the Islanders were recruited from the New Hebrides and the Solomons, and only later from the New Guinea area between 1876 and 1884. They spoke "Pidgin English." (Sheppard, pp.108-9, 142).

(d) The Islanders initially were not numerous: by 1868, 1,539; by 1871, 2,107. Later, they increased: by June, 1883, 13,697 had arrived. (Sheppard, pp.20, 107-9).

That Pidgin was introduced to the New Guinea area by labourers returning from Queensland, and is therefore essentially the same form as that used by Pacific Islanders there, is discounted on historical evidence by R.F. Salisbury. He argues that Pidgin developed in New Guinea from 1875-1877 onwards from a widespread Pacific trade language: "Pidgin's Respectable Past," *New Guinea, and Australia, the Pacific, and South-East Asia*, 2 (June-July 1967), pp.44-8.

From all this evidence, a direct genetic connection between the far north-western Queensland *L* form and New Guinea Highlands Pidgin is
unlikely. That some modification of the older Aboriginal Pidgin was
effected by contact between Pacific Islanders and Aboriginals is
possible. The Islanders were employed in Queensland coastal agriculture,
especially later on sugar plantations; but early some were also
employed as 'shepherds' on outback stations (Sheppard, pp.20,32-3).
Contact with some variety of the widespread Pacific trade language
through intercourse with the East Indies is also possible. Further
careful historical and linguistic research on this problem is needed.

9. Described in my "Differentiation of Homonyms in Communicative
Japanese Utterances," Zeitschrift für Phonetik (Berlin), 20, 3 (1967),
pp.223-4.
The need to apply instrumental techniques to the study of the
intonation of free speech was emphasized by Professor D.B. Fry, in the
Round Table Discussion (forthcoming in the Proceedings) at the Sixth

10. Statements of frequency variation are not useful for linguistic
comparison of the utterances of speakers with different voice ranges,
because frequency does not vary directly with pitch. Therefore, for
comparative purposes, intersyllabic frequency variations are expressed
in terms of corresponding semitones of pitch, determined by a
logarithmic formula based upon the mathematical relation of frequency
to pitch intervals (stated, e.g., in Sir James Jeans, Science and
Music, Cambridge, CUP, 1938, p.21; C.A. Culver, Musical Acoustics,
Ph.D. diss., Texas, 1961, repr. University Microfilms, Ann Arbor,
Michigan, 61-4694, pp.98-100.

11. Quantitative, "i.e., concerned with the frequency, relative
importance, functional burden etc. of a linguistic unit, process etc.,
versus mere presence, occurring in the inventory...:" O.S. Akhmanova,
"Linguistics and the Quantitative Approach," Preprint, 10th International
Congress of Linguists, Bucharest, 1967, pp.2-3 (forthcoming in the
Proceedings).

12. It is doubtful whether syllables below .07 sec. duration are
perceived, except as part of the word pattern in which they occur.
Syllables of .07 or less are on the threshold of human perception.


15. These dependent non-clausal units occurring in conversational discourse as exponents of elements of utterance structure were earlier called 'minor' sentences by Bloomfield and 'nonprincipal' sentence types by Nida (L. Bloomfield, *Language*, N.Y., Henry Holt, 1933, p.171; E.A. Nida, *Syntax*, Glendale, Summer Institute of Linguistics, 1946, p.26).

16. The psycholinguistic reasons for this would make an interesting study.

17. Pronouns and pronominal adjectives are here counted as function ('grammatical', 'structural') words.

18. Space forbids exemplification of other sentence types.