Tone It Down

The complexity of tone in Papuan languages

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I. INTRODUCTION

Tone languages are languages in which "an indication of pitch enters into the lexical realisation of at least some morphemes" (Hyman, 2001, p. 1367). Tone is a common feature of Papuan languages, a grouping of non-related, non-Austronesian and non-Australian languages spoken indigenously in New Guinea and its surrounding islands. This essay seeks to chart the complexity of tone systems in Papuan languages. To do this, I will first survey recent works on tone in Papuan languages, charting the development of linguists' understanding of the phenomenon. Then, this essay will describe Iau (Lakes Plain), Mian (Ok), Coastal Marind (Anim) and Urama (Kiwai), in the process exemplifying the complexity and diversity of tone in the region.

II. LITERATURE REVIEW

There have been three major texts written in the past 25 years concerning tone in Papuan languages: Donohue's 1997 work on tone in New Guinea, van Zanten and Dol's 2010 study concerning pitch-accent in Papuan languages and Cahill's 2011 examination of tone in the languages of Papua New Guinea. Donohue's (1997) study on tone in Papuan languages identified key categories of tonal systems and explored their manifestations and complexities in several languages. Donohue identifies three main categories of tone present in Papuan languages: syllable-tone, word-tone and pitch-accent, though he notes

that he does not exclude the possibility of other systems being present (Donohue, 1997).

Donohue (1997) illustrates that syllable-tone languages in New Guinea exhibit considerable variation. Syllable-tone languages have a tone system "that allows each syllable in [a] word to bear a distinct tone" (Donohue, 1997, p. 353). The number of contrastive tones present in the languages studied varies from two to eight, with the number of syllables present in a language's words being inversely proportional to the number of contrastive tones. There may be complete independence between syllables or restrictions on the distribution of tones. Furthermore, most languages in the region have a mix of level and contour tones. Syllable-tone languages are the most likely tonal systems to spread to other, non-tonal languages, resulting in isolated tone languages within non-tonal families that appear to have gained tonal features through language contact (Donohue, 1997).

Contrasting word-tone from syllable-tone, Donohue (1997) defines word-tone systems as systems where the "word as a whole is more important than the syllable as a domain for the assignment of tones" (Donohue 1997, p. 360). There is significant variation between word-tone systems, with different languages employing unique strategies to distribute tonal melodies across stems and words. Within a single language, the inflection point of the underlying tone patterns may vary, resulting in several possible phonetic realisations of one tonal melody. In some cases, the accent may be allowed to be assigned outside a stem, only being phonetically realised when the stem is inflected with prefixes or suffixes. While word-tone languages occur across a wide geographic area, they are relatively more restricted in spread than syllable-tone and pitch-accent systems, typically only found in areas with other tonal languages (Donohue, 1997).

Donohue describes pitch-accent systems as displaying "minimally complex" tonal behaviour in comparison to syllable-tone and word-tone languages (Donohue, 1997, p. 367). Donohue (1997) suggests that

pitch-accent languages are highly common in New Guinea and are found in at least 40% of language families. Similarly to syllable-tone languages, pitch-accent systems occur independently of the tonal status of surrounding languages. Finally, Donohue (1997) notes that there exist intermediate cases between word-tone and pitch-accent systems that cannot be definitively classified according to his definition, as well as certain exceptional uses of tone, such as in Central Asmat, where pitch contrast is limited to ritual words.

Van Zanten and Dol's (2010) examination of pitch-accent systems in Papuan languages expands upon Donohue's discussion. In contrast to Donohue, the authors define pitch-accent systems as those in which the prominence of one syllable is determined through the use of pitch (van Zanten & Dol, 2010, p. 114). The survey found a majority of tonal languages studied were 'hybrid', in that both tone and stress were features of the language. Hybrid languages can be subdivided into those with no relationship between stress position and tone, those where tone is conditioned by stress position and those where stress is conditioned by tone position (a majority of languages). In line with Donohue's analysis, van Zanten and Dol (2010) also note the large variation in prosodic systems employed by languages of the same family, stating that "hardly two languages seem to use the same system" (p. 130). Van Zanten and Dol's categorisation of hybrid languages allows for more clarity surrounding the definition of pitch-accent systems, as it allows for analysis of pitch-accent systems to more easily transcend definitional vagueness.

Cahill (2011) also analyses the broad tonal diversity in Papuan languages, though his study is restricted to Papua New Guinea. Cahill also observes that tone in Papua New Guinea appears to be somewhat independent of genetic lines, with even closely related dialects having different prosodic systems. This analysis aligns with Donohue's explanation of syllable-tone and pitch-accent systems being able to spread as a result of language contact between genetically-unrelated languages. While Cahill analyses several Papuan languages and the

intricacy of their tonal systems, he provides a limited discussion of tonal systems across Papua New Guinea in general. He also offers the same categories as Donohue, dividing Papuan languages between syllable-tone, word-tone and pitch-accent systems. As a result, it is not clear there has been a transformative development in our understanding of tonal systems in Papuan languages, aside from van Zanten and Dol's analysis of specific classifications of pitch-accent systems.

One notable element of Cahill's (2011) work is his classification of languages that have since been re-analysed. Cahill identifies Mianmin (also known as Mian) as a syllable-tone language and suggests that Gadsup is unclassifiable. However, since publication, both languages have been re-analysed as word-tone systems (Fedden, 2011; Pennington, 2014). This reclassification could raise questions about previously offered estimates of the relative frequency of particular tone systems, as the current understanding of some languages may remain flawed.

A major issue in the description of tonal systems in Papuan languages is the contestation of what constitutes a pitch-accent system. Authors variously define pitch-accent as a "minimally complex" tonal system (Donohue, 1997, p. 367), a system in which the prominence of one syllable is achieved by pitch movement as opposed to stress (van Zanten & Dol, 2010, p. 114) or a system in which "there is a constant physical property [i.e., a tone] associated with [an] accent" (Hyman, 1977, p. 4). While these definitions vary according to their criteria, the distinction between the first two definitions may be minimal, as languages that have one contrastive tone that is limited to a single syllable of a word, i.e., a 'minimally complex' tone system, may have that syllable be perceived as increasing in prominence. This is furthered by some authors arguing that high tone can be accent-like in circumstances where tone and stress act simultaneously (Downing, 2010). Similarly, both van Zanten and Dol and Hyman's definitions require tone to be used to achieve an accent, rendering the distinction between their classifications relatively marginal. However, Hyman (2009) instead

suggests that pitch-accent is not a useful classification of languages, as the variation in definitions is so great that there is no prototypical pitch-accent system and unclear boundaries between 'minimally complex' and other restrictive tone systems.

Despite this criticism, this essay will still use pitch-accent to describe specific Papuan languages. The use of pitch-accent as a descriptor by Donohue, Cahill, van Zanten and Dol implies that many authors feel there is merit in clearly distinguishing between tonal systems of significantly different complexities. Furthermore, some languages have been classified as pitch-accent by their researchers without further information available to assess whether their claims of 'accented' syllables are accurate. Finally, it appears as if there would be a significant overlap between van Zanten and Dol's (2010) proposed definition and that of Donohue (1997). This is because any language that achieved the prominence of one syllable by a movement of pitch would likely also have a 'minimally complex' tonal system by Donohue's definition, thus at least somewhat mitigating the scale of possible confusion. However, it should be noted that some languages that Donohue deemed to be of low tonal complexity would not fall into van Zanten and Dol's definition.

III. PAPUAN TONAL LANGUAGES: SOME DESCRIPTIONS

This essay will now shift to describing four Papuan tonal languages to illustrate the complexity of tone in the region. Firstly, I will examine the syllable-tone system present in Iau (Lakes Plain), one of the most complex tonal systems in the world (Foley, 2018, p. 534). Then, I will turn to Mian (Ok), a recently re-analysed word-tone language with five distinct tonal melodies. Finally, I will describe two pitch-accent languages, Coastal Marind (Anim) and Urama (Kiwai) to illustrate the differences between pitch-accent systems.

A. Iau (Lakes Plain)

Iau is a member of the Lakes Plain language family, located in North-western New Guinea (Foley, 2018, p. 530). It is a syllable-tone language with eight contrastive tones, being high (44), mid (33), high-rising (45), low-rising (23), high-to-low falling (42), high-to-mid falling (43), mid-to-low falling (32) and falling-rising (423) (where the numbers 2 to 5 represent the lowest-to-highest extremities of pitch in Iau) (Foley, 2018). Iau is furthermore a largely monosyllabic language, in line with Donohue's (1997) analysis of the relationship between the number of tonemes in a tone system and the number of syllables common in a language's words. This was the result of large-scale truncation which engendered the loss of consonants and syllables while their tone remained. These tones are attached to the remaining syllables, producing an expansion of the language's tonal inventory (Foley, 2018). Tone in Iau provides both lexical contrast and contrast between aspects and other grammatical functions (Bateman, 1990).

Tone in Iau verbs solely functions to provide a contrast between aspects, with verb stems lacking inherent tone, instead inflecting with tone to represent different aspects (Foley, 2018). Each of the eight tones corresponds to an aspect, as seen in Table 1 (Bateman, 1990).

Tone	**Aspect**
High (44)	Totality of action, punctual
Mid (33)	Resultative durative
High-rising (45)	Totality of action, incomplete
Low-rising (23)	Resultative punctual
High-to-low falling (42)	Telic punctual
High-to-mid falling (43)	Telic, incomplete
Mid-to-law falling (32)	Totality of action, durative
Falling-rising (423)	Telic durative

Table 1: the eight tones in Iau and their corresponding aspects

The use of tone to distinguish between the aspect of verbs is evident in (1) and (2). In (1), *baui*^{32} 'come.to.DUR' has a distinct aspect from *baui*^{33} come.to.RESULT in (2). See Appendix A for the abbreviations utilised by Foley (2018).

(1) o^{45} fai^{44}ta^{44} be^{45} baui^{32}
sandbar end OBL come.to.DUR
'We came to the end of the sandbar.'
(Foley, 2018, p. 539)

(2) o^{45} fai^{44}ta^{44} be^{45} baui^{33}
sandbar end OBL come.to.RESULT
'We had come to the end of the sandbar.'
(Foley, 2018, p. 539)

Tone also alters the mood and illocutionary force communicated by Iau's sentence-final mood and speech act particles (Foley, 2018). As is evident in (3), the speaker is understood to have a higher degree of certainty about their presupposition than in (4), communicated by the tonal variation on the question particle.

(3) a^{43} ty^{45} Bi^{45}e^{44} a^{45}se^{44} u^{23} di^{44} be^{44}?
father people Bie SEQ before kill.TOTAL.PUNCT Q.FACT
'So the people from Bie killed father first?'
(Foley, 2018, p. 541)

(4) da^{44} a^{423} tv^{44} be^{43}?
2PL land travel.TOTAL.PUNCT Q.GUESS
'(I'm guessing) did you(PL) go by land?'
(Foley, 2018, p. 541)

There are also tonal restrictions placed on verbs depending on their grammatical properties. Dependent verbs are unable to occur with high, high-to-low falling and mid-to-low falling tones, which is a grammatical rather than restriction due to the occurrence of all eight tenses on free verbs (Foley, 2018).

Overall, the syllable-tone system of Iau is highly complex. While the prevalence of monosyllabic words in Iau has resulted in fewer restrictions on the use of different tones, Iau instead has a very complex

tonal inventory. Tones not only contrast lexical meaning, but have grammatical functions, both communicating the aspect of verbs and subtly contrasting the mood of a speaker's utterance.

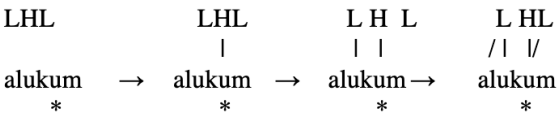
B. Mian (Ok)

Mian is a member of the Ok family, which is a sub-grouping of the Trans-New Guinea family and is spoken in the Sandaun province of Northwestern Papua New Guinea (Fedden, 2011). Despite being initially analysed by Smith and Weston (1974) as a syllable-tone language with very restricted tonal contrasts, leading to it being analysed as such by Cahill (2011), Fedden (2011) instead analyses Mian as a word-tone language. Fedden (2011) justifies this re-analysis by referring to the very limited number of allowed tone patterns in disyllabic and trisyllabic words relative to the possible number of acceptable patterns if Mian were truly a syllable-tone language. Mian is now described as having five tonal melodies that spread out across their tonal domain: L, H, LH, LHL and HL (Fedden, 2011).

The inflection point of the tonal melody is dependent on the type of stem on which the melody inflects. All stems are either unaccented or accented. Unaccented stems have either an L or H tone melody, with the melody consistent across the whole tonal domain. Accented stems have either an LH, LHL or HL melody, with the tonal melody inflecting upon the accented syllable. Stem accented roots have their accents on the stem's last syllable. Off-stem accented roots have their accent on the next syllable to the right of the final stem syllable, or, when the stem occurs without any suffixing morphology, on the final stem syllable (Fedden, 2011). Off-stem accented verbs are a clear example of the phenomenon Donohue (1997) identifies of pitch being assigned to a syllable outside of the stem.

Mian follows invariable steps to assign tones to tone-bearing units once the accent of a stem has been determined. Firstly, the penultimate tone in the tonal melody is associated with the tone-bearing unit of the accented syllable, with all remaining tones associated in a one-to-one fashion with the surrounding tone-bearing units. Then, any unassociated term at the right edge of the word is 'dumped' onto the last syllable, creating a counter syllable. Finally, the leftmost and rightmost tones are mapped to any leftover tone-bearing units in their respective directions (Fedden, 2011). This process is evident in (82), where the penultimate tone of the LHL melody, H is associated with the accented syllable of *alukum* 'all'. Then, the first tone of the melody, L, is mapped to the syllable to the left of the accented syllable, before the final L tone is dumped on the final syllable and the first L tone is spread to the remaining leftmost syllable.

(82) /^{LHL}alukum/ 'all'

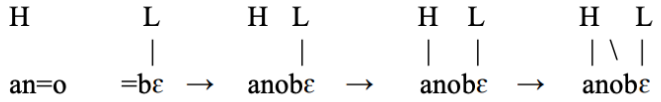


[aluk^{h}ùm] 'all'

(Fedden, 2011, p. 61)

In most instances, phonemic tonal melodies spread across the entire word. However, illocutionary clitics that are specified for tone lie outside the tonal domain of the stem (Fedden, 2011). This is evident in (84), where =o, a toneless predicator, is included in the tonal domain of the stem but the obligatory illocutionary marker =bɛ carries its own tone.

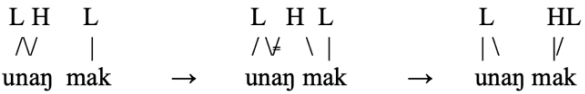
(84) /^{H}an=o=^{L}bɛ/ ‘it’s an arrow’



(Fedden, 2011, p. 63)

Contour tones are sometimes dissolved in continuous discourse, including across word boundaries, particularly when a noun head is followed by a modifier or when a nominal adjunct precedes a verb. In such instances, the second tone in a contour tone on the last syllable of a word is delinked from its syllable and relinked to the next tone bearing unit to the right. When this occurs, the original tone of the second word’s first syllable is discounted (Fedden, 2011). This is evident in (109), where the initial LH tone associated with *ɛil* ‘pig’ is relinked to the first syllable of *ami* 'domestic’, such that *ami* gains an HL tonal melody.

(109) /^{LH}unaŋ/ /^{L}mak/ ‘another woman’ (constituents being /^{LH}unaŋ/ ‘woman’ and /^{L}mak/ ‘other’)



[unaŋ mâk^{h}] ‘another woman’

(Fedden, 2011, p. 71)

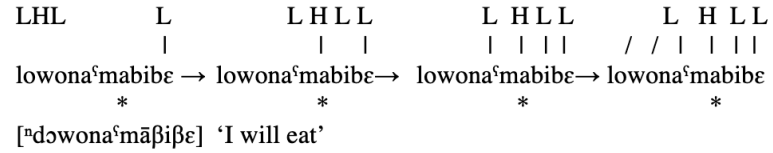
There are restrictions on the tonal melodies allowed in verb stems. All unaccented verbs have an L tonal melody, while accented verbs are specified for either LHL or HL tonal melodies. As with other stems, stem accented verbs have their accent on the stem’s final syllable. Off-stem accented verbs have their accent on the first syllable following the last syllable of the stem, except when there is no suffixing morphology, wherein the accent moves to the last syllable of the stem (Fedden, 2011). However, when a verb takes the irrealis suffixes *-amab* or *-aamab*, there is an inherent accent on the last syllable of the suffix,

which becomes the inflection point of the tonal melody for off-stem accented verbs (Fedden, 2011). This is evident in (126), where the H of the LHL tonal melody attaches to the second syllable to the right of the stem.

(126) /^{LHL}lowonaa|mabibɛ/ 'I will eat'

Morpheme breakdown:

dowôn'-aamab-i=be
eat.PFV-IRR-1SG.SBJ=DECL



(Fedden, 2011, p. 80)

There are several aspects of Mian that elevate its complexity as a tonal language. The dissolving of contour tones when they occur between certain elements in discourse creates exceptions to the overarching rules of tone assignment. Furthermore, the distinction between stem and off-stem accented verbs results in the inflection points of tonal melodies being inconsistent. Finally, in some forms of the non-hodiernal past the subject-marker bears an H tone, disambiguating it from the imperfective, demonstrating that tone has an extremely limited grammatical function in Mian. However, the instances in which this occurs are not entirely predictable, further rendering the Mian tone system complex (Fedden, 2011). Overall, despite the relatively straightforward nature of the tone assignment rules in Mian, there are still several complexities to its tone system.

C. Pitch-accent systems: Coastal Marind (Anim) and Urama (Kiwai)

Coastal Marind is a member of the Anim family, which Olsson (2021) posits is likely a member of the broader Trans-New Guinea language

family. The tonal system of Coastal Marind is manifested in a stress that is characterised by a higher pitch on stressed syllables. As a result, the language has no tonal contrasts (Olsson, 2021). This information suggests that Coastal Marind has a very restricted tonal system that can be classified as a hybrid tone-stress system.

Urama is a member of the Kiwai family, a subgrouping of the Trans-New Guinea family and is spoken in the Gulf province of south Papua New Guinea. Urama has a system of tonal accents. All words must have at least one L tone, but can have a single H accent on any syllable, though it is not necessary (Brown et al., 2016). Similarly to Coastal Marind, this also appears to be evidence of a limited tone system in Urama.

Coastal Marind appears to fall into the definitions of pitch-accent proposed by both van Zanten and Dol and Donohue. The tonal system is not contrastive and only has evidence of one tone, thereby being 'minimally complex'. Furthermore, it also has evidence of prominence being achieved by pitch, though this occurs in conjunction with stress. Urama also appears to fall into Donohue's definition, demonstrating a highly restricted tone system. Van Zanten and Dol's definition may also apply in this case, but it would require more evidence as to whether the 'accent' is considered to be more prominent than other syllables to make such a determination. While these systems are not 'complex', they illustrate the potential for variation within pitch-accent languages, which may have both contrastive and uncontrastive instances of tone.

IV. Conclusion

The evolution of surveys of Papuan languages has largely demonstrated concurrence between authors surrounding the existence of syllable-tone, word-tone and pitch-accent languages in New Guinea. There is also broad agreement that tonal systems demonstrate considerable variation between languages, even within genetic groupings. The area

of greatest disagreement between authors is the definition of pitch-accent, though in many instances the various definitions offered by authors have areas of overlap. Upon analysing Iau, Mian, Coastal Marind and Urama, it is evident that there is significant complexity evident in the tonal systems of Papuan languages, across syllable-tone, word-tone and pitch-accent systems.

Appendix A – Glossing abbreviations

DUR durative
PUNCT punctual
RESULT resultative
TOTAL totality of action

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