Word-prosodic systems of Raja Ampat languages

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Cover illustration: Part of the village Fafanlap (Misool, Raja Ampat archipelago, Indonesia) in the evening light. Photo by Bert Remijsen (February 2000).

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This book is dedicated to Lex van der Leeden (1922-2001),
with friendship and admiration

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Transcription and abbreviations

Transcription

Segmental phonemes and allophones of words of Raja Ampat languages are transcribed following the standard of the International Phonetic Association (IPA), with one exception: IPA [j] is transcribed as [y], in keeping with a practice common in Austronesian studies.

As for the suprasegmental features, phrase boundaries are transcribed by a forward slash, and lexical stress by an accent ˈ preceding the syllable that carries lexical stress. For example, the accent in Maˈya indicates that the final syllable carries lexical stress. The transcription of lexical tones in Maˈya and Matbat is presented in Chapters III and V, respectively.

In the text, the phonological forms of words are transcribed between forward slashes; in tables, on the other hand, phonological forms are not preceded and followed by slashes.

Abbreviations

The following abbreviations are used in glosses.

ADV	adverb
CLAS	classifier
CNJ	conjunction
CS	causative
D.	Dutch
DEM	demonstrative
DIR	directional
FOCP	focus marker (plural)
FOCS	focus marker (singular)
FUT	future tense marker
IMPERF	imperfective aspect
INT	interjection
M.	Malay/Indonesian
NEG	negation
P1S	suffix marking 1st singular
PERF	perfective aspect
POS	possessive marker
PRN	pronoun neuter singular
PRS1S	pers. pron. 1st singular
PRS2S	pers. pron. 2nd singular
PRS1PIN	pers. pron. 1st plural inclusive
PRS3P	pers. pron.3rd plural
PRP	preposition
RL	subordinate clause marker
1S	(verb pref.) 1st singular
2S	(verb pref.) 2nd singular
3S	(verb pref.) 3rd singular
1PIN	(verb pref.) 1st plural inclusive
3P	(verb pref.) 3rd plural

1 Introduction

The student of prosody is struck with both confusion and amazement when confronted with statements on prosody in descriptive grammars. To give an example of the latter, McAllister & McAllister (1991:134) note that Papuan Doutai has "word-timing, i.e., the same time is used for long and short words, causing short words to be lengthened and long words to sound jambled."

An important cause of confusion is the chaos in terminology. Words like 'tone' and 'stress' are used to characterize both word- and sentence-level features, and both for phonemic categories as well as for non-contrastive phonetic phenomena. In many publications it is not specified how terminology is used, and the reader is to infer this from the text. For example, when van der Leeden (1993:57) writes that in Austronesian Ma'ya, "syllable stress [is] a corollary of the tonal system", this suggests he uses tone and stress as phonemic and phonetic features, respectively.

Next to the problem of terminology stands the fact that suprasegmental features are elusive, and can easily be misinterpreted. For example, a number of studies (e.g. Halim 1984, Cohn 1989, and Laksman 1994) have hypothesized that Indonesian has (predominantly) penultimate stress. However, Goedemans & van Zanten (to appear) present compelling evidence leading to the conclusion that it does not, and that what has been interpreted as lexical stress is actually some kind of intonational accent. A number of other Austronesian languages have also been reported to feature stress that is only realized weakly and/or phrase-finally, and these languages could be stress-less as well (van Zanten, Stoel and Remijsen, to appear).

Despite these complicating factors, however, the main reason for the amazement and confusion of the student of prosody when confronted with the descriptive literature is that the statements are true. It is well known that many less-studied languages are gold mines for linguistic typology. As we try to find out what language structures occur, less-studied languages are a crucial quarry of insights.

The languages of the Raja Ampat archipelago certainly fit the label 'less-studied languages'. In fact, before presenting a number of investigations into the word prosodic systems of Raja Ampat languages, it is necessary to introduce them in a systematic manner, because this has not been done before. Even the most basic facts on these languages – their number and their names – are a matter of debate, or rather the lack of it. Chapter II, therefore, sets out to give a general overview of the language situation of the Raja Ampat archipelago, drawing from published and unpublished materials and from my own fieldwork data (see also wordlists and grammar notes in Appendices A and B).[1] While certainly not all questions are solved, this overview does warrant the hypothesis that all Raja Ampat languages are

[1] I carried out fieldwork research in the Raja Ampat archipelago in April of 1999, and in February and March of 2000.

part of the same section of the South Halmahera-West New Guinea (SHWNG) subgroup of Austronesian as the languages of South Halmahera.

The first linguistic study of a language of the Raja Ampat archipelago is the descriptive phonology of Maˈya by van der Leeden (1983, 1993). Van der Leeden hypothesizes that Maˈya has four lexically contrastive tonemes, and also lexical stress, often but not always predictable on the basis of the tonal structure. Van der Leeden's analysis features a high degree of redundancy: apart from the final syllable, almost all syllables carry a low toneme; second, stress is located most often on the syllable that carries the non-low tone. On the basis of new fieldwork data, I arrived at an alternative analysis of the word prosodic system of Maˈya, with only three tonemes, restricted to the final syllable, and contrastive lexical stress (either penultimate or final). This analysis is presented in Chapter III, which begins with an introduction on word prosodic features and hybrid word prosodic systems. Chapter III continues with a presentation of van der Leeden's hypothesis, my alternative hypothesis, and an acoustic investigation of minimal stress pairs, which supports my claim that Maˈya has contrastive stress. Assuming that this analysis is correct, Maˈya is the only tone language in the world that has been demonstrated to feature lexically contrastive stress.

This exciting finding raised two questions. First, how did Maˈya develop this unusual word prosodic system with both stress and tone, and second, are there more (Austronesian) tone languages in the Raja Ampat archipelago?

Van der Leeden (1983, 1993), and the reanalysis presented in Chapter III, are both based on the Maˈya dialect of the island Salawati, one of the three big islands of the Raja Ampat archipelago, on all three of which Maˈya is used (see Figure II.4). I investigated the variation in the word prosodic system of Maˈya within and between the dialects of the various islands, hoping that some dialect would reflect an older stage of the language, and show how the unusual word prosodic system of Maˈya had come into existence. While falling short of this expectation, this comparative study resulted in the acoustic comparison between the lexical tone systems of three Maˈya dialects. Interesting features include a push chain tonal shift, tone loss and an intonational boundary tone. This study is presented in Chapter IV.

Another method to answer the first question is by a historical-comparative investigation. A comparison of Maˈya lexical items to cognates in genetically related languages and to the reconstructions of these lexical items in ancestor languages can deliver indications of the origins of stress and tone in Maˈya. This approach was successful, because Maˈya reflects the Proto-Austronesian lexicon relatively faithfully. This study, presented in Chapter VI, shows a number of diachronic processes that have taken place in the segmental phonology of Maˈya and of Proto-South Halmahera-West New Guinea, the protolanguage that preceded it. Importantly, these processes have affected the word prosodic system of Maˈya, and in this way they allow us to reconstruct, to some extent, how Maˈya came to feature both tone and stress.

I also conducted a fieldwork survey of all languages of the Raja Ampat archipelago (except Bata), investigating whether any of them featured lexical tone

contrasts. This investigation was motivated on the one hand by the above question – how did Ma'ya develop stress and tone. Other Raja Ampat languages might feature lexical tone as well, or both tone and stress, and these systems might shed light on the word prosodic system of Ma'ya. On the other hand, this survey was also worthwhile because the discovery of lexical tone in Ma'ya by van der Leeden suggested there could be other (Austronesian) tone languages in the Raja Ampat archipelago.

Lexical tone is very rare among Austronesian languages: out of 1,236 (Grimes 1996) Austronesian languages, no more than 14 (1.1 percent) have been reported to feature lexical tone.[2] I discovered that Matbat, a Raja Ampat language of Misool, has a tone system with five lexically contrastive tonemes. Chapter V gives a phonological analysis of the tone system, and presents the results of an acoustic analysis of the Matbat tones on monosyllabic words. The discovery of lexical tone in Matbat has implications for the interpretation of tonogenesis in the Raja Ampat archipelago.

Appendix A contains 133-item wordlists of all languages of the Raja Ampat archipelago save Bata, which may be extinct. Appendix B has grammar notes on the languages represented in Appendix A. The other two appendices are only loosely related to the subject of this study. They are motivated by the fact that so little information is available on the Raja Ampat archipelago. Appendix C presents an overview of the ethnic groups of the Raja Ampat archipelago, and of its history. Apart from presenting my own findings, I refer to all relevant studies known to me. Appendix D, finally, contains a transcribed Ma'ya narrative.

Sound examples of the word prosodic features discussed in this study – lexical tone in Matbat, and lexical tone and contrastive lexical stress in Ma'ya – can be found on the internet at http://www.leidenuniv.nl/pil/.

[2] Five languages of New Caledonia (Rivierre 1993), the Chamic languages Eastern Cham (Edmondson & Gregerson 1993) and Utsat (Maddieson & Pang 1993), Mor (Laycock 1978), the North Huon Gulf languages Yabem and Bukawa (Ross 1993), Kara, Barok and Patpatar, all three in New Ireland (Hajek 1995), and Ma'ya (Van der Leeden 1983, 1993).

2 The languages of the Raja Ampat archipelago

2.1. About this chapter

This study deals with the word prosodic systems of the languages of the Raja Ampat (RA) archipelago. Before anything can be said about this subject, however, it is necessary to introduce the RA languages themselves. This is not a trivial matter. Listings and classifications of Austronesian languages that include the languages of the RA archipelago disagree on the number of languages, their names, and their genetic classification. For example, Wurm (1994) and Grimes (1996), both standard reference publications, list Laganyan and Kawe as separate languages of Waigeo; Smits & Voorhoeve (1992), on the other hand, consider Laganyan and Kawe as dialects of Maʲya. There are many other points of disagreement between sources. Rather than originating from competing theoretical predictions, the differences between the various studies are due to gaps in our knowledge. Evidently, these gaps are of a very basic nature: e.g. how many languages are there in the RA archipelago, what are their names? Because the languages of the RA archipelago have attracted so little research, a linguist studying language X that is used on one island of the RA archipelago, may be led to the assumption that X is different from Y on the next island, of which only the name is known.

This chapter gives an overview of all languages of the RA archipelago. Apart from the necessity of introducing the languages that are the focus of investigations into word prosody in this study, this chapter is also motivated by the importance of clarifying the state of our knowledge of the languages of the RA archipelago. This overview is based on published and unpublished sources, and also on the fieldwork survey I carried out on the languages of all three of the big islands of the RA archipelago: Waigeo, Salawati, and Misool.[3]

I use the term 'Raja Ampat languages' to refer to the original languages of the Raja Ampat archipelago: Maʲya, Ambel, Matbat, Biga, and the dialect(s)/ language(s) of the interior-oriented groups of Salawati.[4] Wordlists of all these languages are added in Appendix A, with some notes on morphology in Appendix

[3] During February and March 2000, I collected survey data in the following villages in the RA archipelago: Samate and Fiawat on Salawati, Fafanlap and Mage on Misool, Selpale, Wauyai and Luptintol on Waigeo. I also collected data from informants (speakers of Ambel, Matbat and Maʲya) who lived in Sorong.

[4] The various ethnic groups of the RA archipelago are introduced in Appendix C.

B. There are three more RA languages, of which I did not collect data myself: Bata, Gebe and As. Gebe and As are not located in the RA archipelago, but they are Raja Ampat languages in the genetic sense (Grimes 1996). Bata, finally, is the undocumented and possibly extinct RA language of Batanta (Polansky 1957, van der Leeden 1993).

Section II.2 gives background information on the history of the South Halmahera-West New Guinea subgroup of Austronesian, to which the RA languages belong. Then follows the overview of RA languages (§ II.3). The chapter is concluded by a discussion of the genetic position of the RA languages within the South Halmahera-West New Guinea subgroup of Austronesian (§ II.4).

2.2. Background

2.2.1. The Austronesian and the Papuan languages, and their origins

There are two groups of languages in insular southeast Asia and the Pacific (excluding Australia). One is the Austronesian language family, the other are the Papuan languages. While the Austronesian languages constitute a genetic family, in the sense that all Austronesian languages hypothetically derive from a single parent language (Proto-Austronesian), a similar genetic relationship is not hypothesized for the Papuan languages (Foley 1986). Instead, when a language is attributed the label 'Papuan', this merely implies that it is (a) not Austronesian; (b) used on New Guinea or on an island in its vicinity; (c) features a number of structural properties common among Papuan languages (Foley 1986, 1998). On New Guinea (see Figure II.1), Austronesian languages are confined to certain coastal areas on the north, east and west sides of the island, while the Papuan languages are used elsewhere on the island. Outside New Guinea, Papuan languages are found on the northern half of Halmahera, on Timor and some islands in its vicinity.

The Austronesian and Papuan languages got established through different waves of prehistoric migration. During the Pleistocene period, which lasted until approximately 8,000 B.C., the landmasses of Australia and New Guinea were joined in a single continent called Sahul. At least by 50,000 B.C., the Sahul continent was colonized by hunter-gatherers who came from the southeast Asia mainland (see Figure II.1). These hunter-gatherers are the ancestors of the Papuans of New Guinea and the Aboriginals of Australia (Spriggs 1998). There are no prehistoric archeological data from the RA archipelago, but evidence of human occupation just off the Sahul shelf, on nearby Gebe Island (see Figure II.3) around 31,000 B.C., suggests that the RA islands were inhabited around that time (Bellwood 1998). This hypothesis is further supported by the fact that the RA islands lie on the route from Halmahera to the Sahul continent (Spriggs 1998). Together with a more southern approach via the Sunda Islands, this is the only route over which first colonization of Sahul by hunter-gatherers could have taken place. After 31,000 B.C., there is

evidence of continuous human presence on Gebe and on Halmahera (Bellwood 1998).

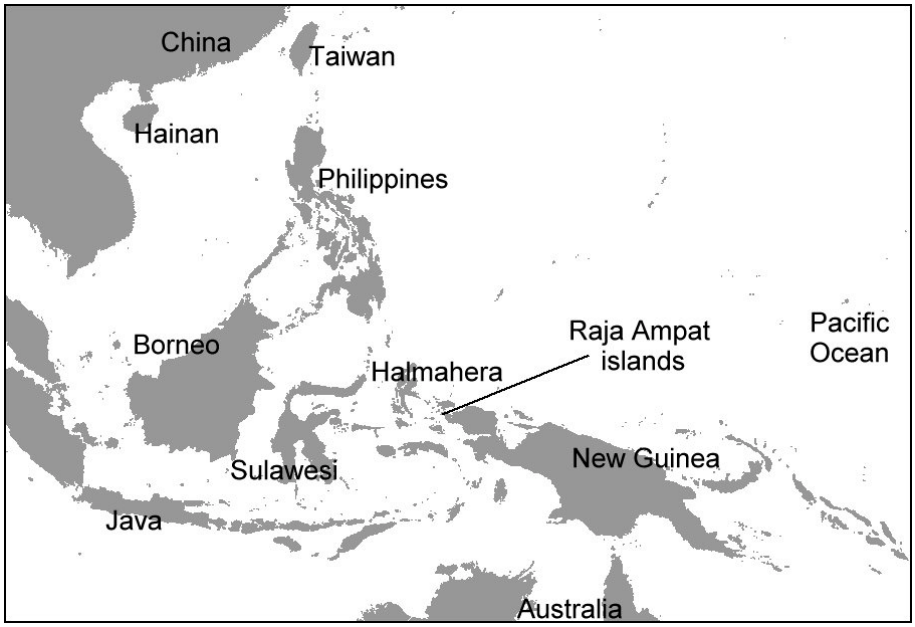

Figure II.1: Map of insular southeast Asia.

A second colonization of insular southeast Asia and New Guinea took place from around 3,000 B.C. onwards. A population of farmers set out from south China or Taiwan, and migrated southward via the Philippines. The archeological evidence suggests that this group grew rice and millet, kept chickens, pigs and dogs, and made red-slipped pottery (Bellwood 1997). On the basis of evidence of this cultural complex in the archeological record, the migration of this population can be traced from China to the Philippines, Sulawesi and Halmahera (see Figure II.1). Archeologists and linguists alike have identified the spread of this culture with the migration of the Austronesians (Bellwood 1997, 1998, Blust 1985). From Halmahera, the Austronesians moved via the north coast of New Guinea to the Pacific, where they colonized the previously uninhabited islands at a high tempo. In the words of Peter Bellwood, an authority on the Austronesian colonization:

> Austronesians reached the Bird's Head [of New Guinea] at about [1,500 B.C.] and established their enclaves in Waigeo, Misool and Cendrawasih Bay. From there, there were presumably moves to the Admiralty Islands and the Bismarck Archipelago, followed by further dispersal into Oceania after about [1,200 B.C.]. [Bellwood 1998:961-962]

Agriculture can feed a much larger population than hunting-gathering can, and it is assumed that this advantage allowed the Austronesians to outnumber and replace the non-Austronesian populations of hunter-gatherers wherever they encountered them in insular southeast Asia (Bellwood 1998, Diamond 1998). Two notable exceptions to this pattern are northern Halmahera and the interior of New Guinea, where Papuan populations survive until now. Importantly, it appears that the Papuan population of New Guinea developed agriculture between 7,000 and 4,000 B.C. (Bellwood 1998, Spriggs 1998). As a consequence, the population density of New Guinea would have been so high that settlement was unattractive to Austronesians (Bellwood 1998, Diamond 1998). No evidence of agriculture preceding the Austronesian settlement has been reported for Halmahera. In any case, the Austronesians did not replace the original Papuan population in these areas, and their settlements remained confined to southern Halmahera and the coastal areas of west, north and east New Guinea.

2.2.2. The South Halmahera-West New Guinea subgroup of Austronesian

2.2.2.1. In general

The Austronesian language family is one of the largest language families in the world. According to Ethnologue, the overview of the world's languages, it comprises 1,236 genetically related languages (Grimes 1996). The Austronesian language family extends from Madagascar to Easter Island. The similarity between the Austronesian languages of South East Asia and those of Polynesia was recognized at the beginning of the seventeenth century, relatively soon after the exploration of the Pacific (Clark 1987). Whereas the methodical study of the Austronesian languages and their common ancestor began in earnest in the eighteenth century, the main contributions to the study of Austronesian comparative and historical linguistics are Dempwolff (1934, 1937, 1938), Dyen (1953), and Blust (1978). Figure II.2 presents the classification of the Austronesian languages following Blust (1978), which is widely accepted by now. This tree-model of the relations between Austronesian languages has been corroborated by quantitative analysis (Gray & Jordan 2000).

Within this tree-model of the history of the Austronesian language family, the languages of south Halmahera, the Raja Ampat archipelago and a number of languages of coastal West New Guinea constitute a single subgroup. The relation between these languages was first established by Adriani & Kruijt (1914), and later the group was named South Halmahera-West New Guinea (SHWNG) by Esser (1938). Blust (1978) provided definitive support for the SHWNG subgroup, by demonstrating that all SHWNG languages share a set of 5 phonological innovations, which are lacking in the non-SHWNG Austronesian languages. He explains the co-occurrence of these innovations by attributing them to a common ancestor, Proto-SHWNG. Another characteristic of the SHWNG languages is that they have retained a smaller proportion of the Proto-Austronesian lexicon (Blust 1985:58) than other

Austronesian languages. The most likely cause of this phenomenon is the contact with the neighboring Papuan languages.

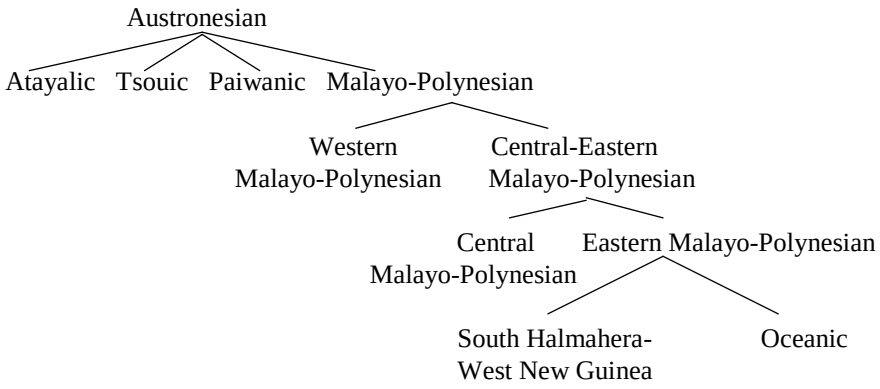

Figure II.2: The Austronesian languages (highest levels only) (after Blust 1978).

2.2.2.2. Within the South Halmahera-West New Guinea (SHWNG) subgroup

Within the SHWNG languages, Blust (1978) draws a distinction between the South Halmahera (SH) and West New Guinea[5] (WNG) subgroups. The most conspicuous difference distinguishing the SH and WNG subgroups is a liquid-rhotic split. Proto-Austronesian (PAN) *d,D,z,Z,l,r[6] became /l/ in the SH languages, and /r/ in the WNG languages (Blust 1978).

On South Halmahera (see Figure II.3), the SH subgroup comprises Buli, Maba, Patani, Sawai, Gane and Taba (also known as Makian Dalam) (Taber 1996). On the basis of both his own comparative research and of statements in Adriani & Kruijt (1914) and Maan (1951), Blust points out that Buli, Maba, Patani and Sawai constitute "a dialect continuum in which even the extremes do not differ greatly"

[5] While Blust (1978) labeled the SHWNG languages of West New Guinea 'Sarera Bay', this group is labeled 'Geelvink Bay' in Wurm & Hattori (1981) and Wurm (1994), and 'West New Guinea' in Grimes (1996). Harmonizing between terminology, I refer to this subgroup as 'West New Guinea' or 'WNG'. Sarera Bay, Geelvink Bay and Cendrawasih Bay all refer to the same bay. It is currently referred to as Cendrawasih Bay.

[6] Because there is no direct evidence of the phonetic realization of the phonemes that have been reconstructed for Proto-Austronesian, hypotheses on their phonetic value are highly speculative, and for that reason, they are not represented by means of IPA symbols. For a discussion of the possible phonetic realization of the Proto-Austronesian phonemes, the reader is referred to Ross (1995:55-64). In this study I use Dyen's orthography of the PAN phonemes, as listed in Ross (1995:54) and Blust (1978:192).

(Blust 1978:198).[7] Blust labels this chain of closely related languages or dialects 'Central-Eastern'. The two remaining Austronesian languages of south Halmahera, Taba and Gane, together constitute a Southern dialect chain, distinct from the Central-Eastern one. The distinction between these two dialect chains is motivated by "a substantial number of lexical isoglosses that appear to be shared exclusively by the Southern languages" (Blust 1978:199). Blust also includes two languages of Misool in the SH subgroup, because they share the phonological innovations that distinguish this subgroup, among others the /l/ reflex for the liquid-rhotic split.

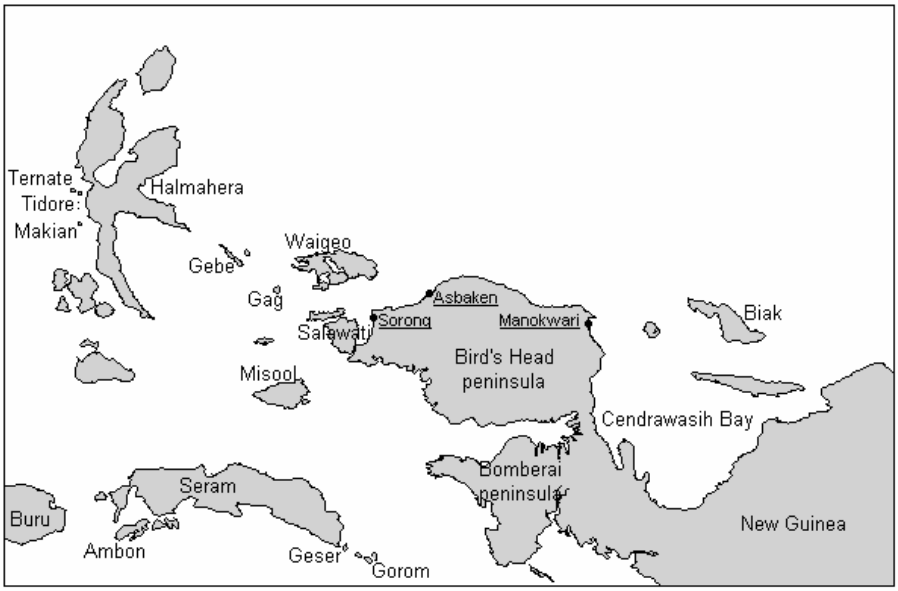

Figure II.3: Map shwowing Halmahera and West New Guinea.

Of the members of SHWNG in West New Guinea, the languages of Cendrawasih Bay (see Figure II.3) are the best known. Between-language variation among the WNG languages is considerably greater than within the SH branch (Blust 1978). As a consequence, both Blust (1978) and later Grimes (1996) hypothesized a more complex structure relating the SHWNG languages of Cendrawasih Bay, reflecting the more substantial differences between the Austronesian languages within that subgroup of SHWNG.

The classification of SHWNG languages in Blust (1978) is not exhaustive. Apart from the two languages of Misool mentioned above, the languages of the Raja Ampat archipelago are not assigned to either of the two subgroups within SHWNG, and neither is Irarutu, an Austronesian language of Bintuni Gulf, on the southwest

[7] Blust (1978) also mentions Weda but Whisler (1992) points out that this is an alternative label for Sawai.

coast of New Guinea. This leaves unanswered the issue of the boundary between the SH and WNG language areas: is this boundary located in the RA archipelago, or further to the east?

Because the Austronesian languages of the Cendrawasih Bay area feature considerably more linguistic diversity than the South Halmahera area, Blust (1978, 1985) hypothesizes that the Austronesian migrants who spoke Proto-SHWNG initially lived in the Cendrawasih Bay area, and spread from there westwards to South Halmahera. The large degree of similarity between the South Halmahera languages suggests that this migration took place relatively recently, and therefore well after the initial arrival of the Austronesians in Western New Guinea in around 1,500 B.C. Blust suggests that this westward migration took place "within the past 1,000-1,200 years" (Blust 1985:58).

2.2.2.3. Contact between SHWNG and the Papuan languages

The languages of Halmahera, the RA archipelago, the Bird's Head of New Guinea and Cendrawasih Bay have each been classified as either Austronesian or Papuan. This classification, based on shared phonological innovations and similarity in the vocabulary, has resulted in a clear division, with the languages of south Halmahera, the RA archipelago and Cendrawasih Bay being classified as Austronesian, and the languages of north Halmahera and most languages of the Bird's Head classified as Papuan. When structural features are taken into account, the distinction between the Austronesian and the Papuan languages in this area is less clear-cut. Table II.1 contrasts some of the typically Papuan and typically Austronesian features listed in Foley (1998), based on the Austronesian and Papuan languages in general. In the area consisting of Halmahera, the Bird's Head and the islands around it, Papuan languages feature some typically Austronesian grammatical features, and the way around Papuan features occur in the Austronesian languages. For example, Reesink (1998) presents evidence that each of the typically Austronesian morphological and syntactic features listed in Table II.1 occur in either all or various of the Papuan languages of the Bird's Head.

Similarly, the Austronesian languages of the SHWNG subgroup feature a variety of Papuan characteristics. Lexical tone has been found for the WNG language Mor (Laycock 1978), and for the RA languages Ma'ya (van der Leeden 1983, 1993) and Matbat (see Chapter V).

Table II.1: Some grammatical features characteristic of Austronesian and Papuan languages, respectively, on the basis of Foley (1998).

	Austronesian languages	Papuan languages
Phonology	• Lexical tone is very rare. • Stress predominantly on penult. • "A phonemic distinction between /r/ and /l/ is universal." [Foley 1998]	• Various types of tone systems occur. • Initial stress is common. • Phonemic contrast between /r/ and /l/ is rare; majority only have one.
Morphology	• Isolating. • Little inflectional encoding of functional categories. • Exclusive / inclusive contrast in first person plural.	• Agglutinative. • Inflectional encoding of tense, aspect, mood, gender, number, etc. • No exclusive / inclusive contrast in first person plural.
Syntax	• Subject-Verb-Object (SVO). • Possessed-Possessor order in genitive construction.	• Subject-Object-Verb (SOV). • Possessor-Possessed order in genitive construction.

Also, while the /r/ vs. /l/ contrast is most common in Austronesian languages (Foley 1998), it was lost in Proto-SHWNG. As mentioned above, PAN *d,D,z,Z,l,r all became /l/ in the South Halmahera languages, and /r/ in the languages of the West New Guinea branch of SHWNG (Blust 1978). Some SHWNG languages, such as Taba (Bowden 1997) and Sawai (Whisler 1992), have developed the contrast between /l/ and /r/ as a phonological innovation. Other SHWNG languages, however, have retained the phoneme of their branch. In this way, WNG Mor only has /r/ (Laycock 1978), and SH Matbat only has /l/.

(1.1)

ˈene	ni-k	ˈnasa^{3}n	hud	arˈfan
PRS1S	POS-P1S	name	Hud	Arfan

My name is Hud Arfan.

(1.2)

maˈla^{3}	ˈtala^{3}	kaˈluno
blue	banana	leaf

Green.[8]

[8] Maˈya and the other RA languages for which I collected data do not distinguish green from blue. Usually, the default referent of the word for blue/green is blue. When referring to green explicitly, an

As for morphosyntax, most or all SHWNG languages – e.g. Biak (Steinhauer 1985), Taba (Bowden 1997), and all RA languages (see appendix B) – feature a prefix marking subject-agreement for number (1/2/3 persons singular and plural) on the verb. Also, while most Papuan languages of the Bird's Head have Austronesian-style Possessed-Possessor order, various SHWNG languages have the typically Papuan Possessor-Possessed order, as illustrated by the Ma'ya examples in II.1 and II.2.

In Ambel, aspect (imperfective vs. perfective) appears to be morphologically encoded on verbs (see Appendix B). If this finding can be confirmed, it provides additional compelling evidence of the Papuan influence on the Austronesian languages of the Raja Ampat archipelago.

SHWNG languages like Ma'ya can be hypothesized to have developed such typically Papuan features through two different scenarios. On the one hand, these Papuan features could have been acquired through language contact, following from social contacts – e.g. intermarriage and trade – that caused Papuan-language speakers to become part of a community speaking an Austronesian language.[9] It is the scenario of intermarriage that Reesink (1998) hypothesizes to be the cause for the spreading of typically Austronesian features among the Papuan languages of the Bird's Head.

For the SHWNG languages, however, there is a second possible language contact scenario. The typically Papuan features may be remnants of Papuan substrate languages that were used in the area before the arrival of the Austronesians. In other words, lexical tone in Mor, Matbat and Ma'ya could be remnants of the Papuan substrate of these Austronesian languages, rather than features they developed later on through contact with a Papuan language. In § V.4.2 and § VI.4.2, I will hypothesize that the scenario of a Papuan substrate with lexical tone indeed accounts for the origin of lexical tone in Matbat and Ma'ya.

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expression is used like the one in example (II.2), which can be translated literally as 'blue as the leaf of the banana plant'.

[9] There is clear evidence that the Ma'ya villages of the RA archipelago played an important role in the slave trade between New Guinea and the Moluccas (Miedema 1984, Huizinga 1998). This issue is discussed at greater length in Appendix C.

2.3. An overview of the languages of the Raja Ampat archipelago

2.3.1. Ma'ya (Salawati, Misool, Kawe, Wauyai and Laganyan dialects)

2.3.1.1. In general

Ma'ya is the RA language with the greatest number of speakers – approximately 4,000. It is the language of the traditionally sea-oriented groups of Waigeo, Salawati and Misool (see Appendix C). Although this language is referred to as Maya or Ma'ya[10] in the literature (Polansky 1957, Smits & Voorhoeve 1992, van der Leeden 1983, 1993), this label is unknown in many Ma'ya speaking villages. Instead, people in the RA area refer to Ma'ya inconsistently by means of a variety of labels, such as (in Malay) *bahasa Raja Ampat*, *bahasa Misol* (on Misool), *bahasa Samate*, *bahasa Salawati* (on Salawati). The Waigeo dialects of Ma'ya (Laganyan, Wauyai and Kawe) are known by their own names.

Dialectal variation between and within the Misool and Salawati dialects is limited. On Waigeo, on the other hand, the Laganyan, Wauyai and Kawe dialects stand out relative to one another and to the Misool and Salawati variants. The differences between the various Ma'ya dialects will be discussed in more detail in § II.3.1.2.

The Salawati variant has around 750 speakers, with Samate and Sailolof being the main centers (see Figure II.4). Speakers of Ma'ya have migrated from Samate to Dom (near the regional capital city Sorong) and Kalobo, the transmigration village on the east coast of Salawati. Of all Ma'ya variants the Salawati dialect has the highest status (van der Leeden 1993:13), and speakers of at least some of the other dialects (Wauyai and Laganyan) consider it as a norm. It derives this status from its association with the village Samate, the traditional seat of the *raja* of Salawati, who was the most powerful ruler of the Raja Ampat area between 1700 and the end of the 19th century (see Appendix C).

The Ma'ya of Sailolof make a distinction between the seaward and landward parts of the village, which are known as Palata '[lit.] front side' and Palamul '[lit.] back side', respectively. Similar distinctions are made in other Ma'ya villages (van der Leeden, p.c.). It is unclear to what extent the inhabitants of these two parts stand out from one another. According to Polansky (1957), the inhabitants of the Palamul have intermarried with the people of the interior, while the Palata people have not. Polansky notes that these two groups speak a different dialect of Ma'ya. Wurm and Hattori (1981), Wurm (1994) and Grimes (1996), on the other hand, list Palamul as a language. It is unclear what data this listing is based on. I assume that, if Palamul is a language different from Ma'ya, it is the Kawit language of the people of the interior of south Salawati (see § II.3.5). Van der Leeden (1993) notes that Kawit

[10] The accent in Ma'ya, indicating final stress, was first used in van der Leeden (1983), in order to distinguish Ma'ya from the Amerindian language with the same name.

people have moved from the interior to the coast, among others to Sailolof. A note in Grimes (1996), saying that Palamul is used in "southwestern Salawati Island around Sailolof", is in agreement with this hypothesis that Palamul would be an alternative name for Kawit in the Sailolof area. That is, if Palamul were a dialect of Maʲya, it would be located in rather than around Sailolof.

Maʲya stands its best survival chances on Misool, the island located furthest from the city of Sorong. Here Maʲya is used with little or no internal variation in five relatively big villages (Fafanlap, Lilinta, Gamta, Yellu and Waigama – see Figure II.4 and Table II.5). I estimate the total number of speakers of Maʲya on Misool to be around 2,250. While the call of the city is less strong on Misool than on RA islands further to the north, the threat to Maʲya lies in immigrants attracted to the rich fishing grounds off the southeast coast, the area where most of the Maʲya villages on Misool are located. In the villages Yellu and Harapan Baru, the large proportion of migrant settlers among the population has caused language use to shift from Maʲya to Malay.[11] Also, the status of Waigama as local administrative center implies an influx of outsiders, which inevitably diminishes the position of Maʲya in communication. On the whole, Maʲya is strongest in Fafanlap and Lilinta, two relatively big villages where the status of Maʲya as the main language has not been challenged by Malay and other languages to the extent it has in other Maʲya villages.

Kawe, Wauyai and Laganyan are the three dialects of Maʲya on Waigeo. Apart from featuring more dialectal variation, the Maʲya-speaking communities are smaller on this island. The Laganyan dialect, which is the Waigeo variant that is most similar to the Salawati and Misool dialects, is spoken in two or three villages in Mayalibit Bay: Lupintol, Arway[12] and possibly Bew.[13] These villages are small, with approximately 150 people each. Wauyai is the Maʲya variant of the village Wauyai in Kabui Bay. The village has approximately 350 inhabitants, almost none of which are migrants. Wauyai is located near an ancestral site related to the Maʲya migration myth, and people in the village are well aware of their relation with the Maʲya of Salawati and Misool (see Appendix C). Kawe, finally, is the dialect of the villages Selpale and Salyo (each approximately 300 inhabitants). Both of these villages are located in Aljui Bay in West Waigeo.

[11] The position of Malay in Indonesia and in the RA archipelago is discussed in § II.3.7.

[12] The village of Arway used to be located on Yefnu ('coconut palm island') in Mayalibit Bay. The villagers moved after a disease hit Yefnu. This move happened relatively recently – van der Leeden, based on fieldwork carried out from 1979 to 1983, only mentions Yefnu (Yeflu in van der Leeden 1993).

[13] Hartzler (1978), who lists Bew (Beo in Hartzler) among the villages speaking Laganyan (Legenyem in Hartzler), reports that in this village people communicate in Malay.

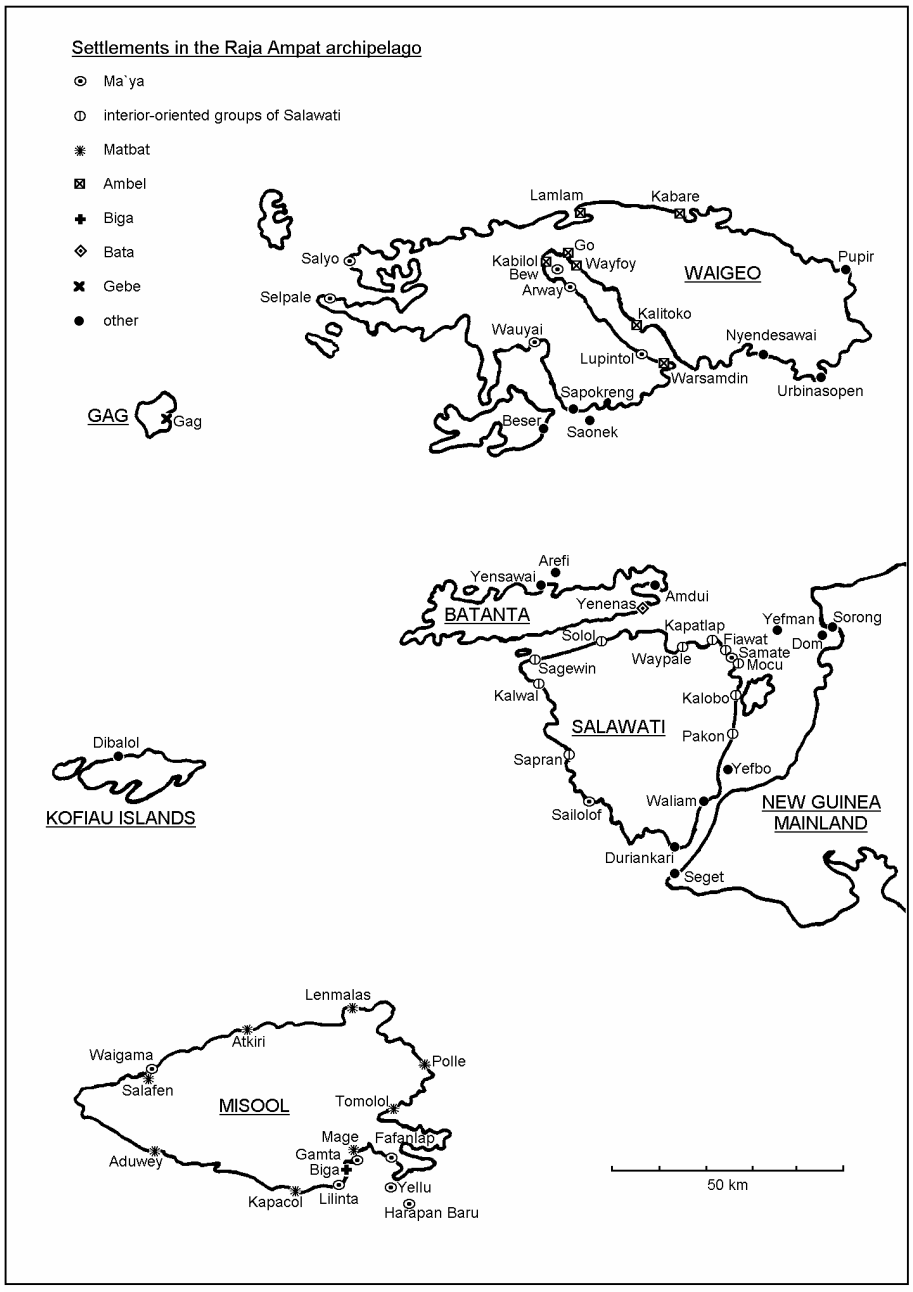

Figure II.4: Map of the Raja Ampat archipelago, showing the location of villages.

Native speakers of Ma'ya are conscious of the differences between the dialects of the various villages, and they have normative opinions about which dialect is more refined. As mentioned above, the Salawati dialect has the highest status. Among the Waigeo dialects, speakers of the Wauyai dialect consider their own dialect as more refined than Kawe, but less refined than Laganyan.

Until recently, Ma'ya served as the lingua franca of the Raja Ampat archipelago (van der Leeden 1993). On Salawati, for example, people from all villages spoke Ma'ya as a second language in the 1950's (Polansky 1957). In the middle of the 19th century, the biologist Wallace noted that there was a language that was used "on all the coasts of Mysol, Salwatty, the northwest of New Guinea, and the islands of the [Cendrawasih Bay]" (Wallace 1869:355). While Wallace did not visit the Cendrawasih Bay, this statement suggests that the function of Ma'ya as lingua franca of the RA archipelago and the north coast of New Guinea goes back at least 150 years. Nowadays this function is gradually being taken over by Malay, dialects of which are becoming increasingly dominant in Indonesia (see § II.3.7).

A number of wordlists have been collected of the various dialects of Ma'ya. Van Peski (1914) and list number 49 in Wallace (1869) both represent the Misool dialect. On the basis of these two lists, Blust (1978) classified the language as belonging to the SH subgroup of SHWNG. Van der Leeden (1983) presents Swadesh-lists of both the Salawati and Misool dialects. A comparison of these lists reveals that the vocabularies of these two dialects are very similar. Hartzler (1978) has short wordlists of the three Waigeo dialects of Ma'ya and a list labeled 'Raja Ampat', which can be attributed to the Misool dialect.[14] Finally, the J.C. Anceaux collection of wordlists of the languages of the Indonesian part of New Guinea (Smits & Voorhoeve 1992) includes wordlists of all Ma'ya dialects.

The description of Ma'ya phonology by van der Leeden (1983, 1993) is the first study on a RA language. A typological oddity appearing from this study is that Ma'ya features lexical tone. Though lexical tone contrasts are not unusual in the neighboring Papuan language family (Donohue 1997), they are virtually absent in the Austronesian language family. Also worthwhile mentioning are van der Leeden's as yet unfinished studies on the morphology and syntax of Ma'ya (van der Leeden ms. 2), and a richly detailed lexicon of the language (van der Leeden ms. 1). If these studies can be published, a broad and in-depth account of the Ma'ya language will be available. All van der Leeden's work is based on data from the Misool and Salawati dialects.

It was mentioned above that Ma'ya has five dialects: Misool, Salawati, Laganyan, Wauyai and Kawe. In the next section, I present phonological support for the distinction between these dialects.

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[14] It features /yes/ 'dog', /kawyal/ 'frog', /aglat/ 'worm'. These are words of the Misool dialect, but the Salawati dialect has different words for these concepts: /ka'ble^{3}/, /ka'lam ʃi^{3}k/, and /gara'to^{12}l/, respectively.

2.3.1.2. Dialectal variation

The between-language variation of Maˈya is a contentious issue. In particular, previous studies disagree on the status of Kawe and Laganyan. While Hartzler (1978), Wurm (1994) and Grimes (1996) list Kawe and Laganyan as separate RA languages, Smits & Voorhoeve (1992) consider the language of the Kawe and Laganyan villages to constitute dialects of Maˈya. Similar to Smits & Voorhoeve (1992), I claim that Laganyan and Kawe, together with Wauyai, constitute the Waigeo variants of Maˈya.

The most important evidence in support of this claim is that the hypothesized Maˈya dialects are all mutually intelligible. I observed speakers of the following dialects communicate with one another in Maˈya: Salawati with Misool, Salawati with Laganyan, Salawati with Wauyai, Laganyan with Wauyai, and Wauyai with Kawe. In line with this observation, the vocabularies of the various hypothesized dialects show considerable similarity (see Appendix A). Lexical dissimilarity is greatest between the Salawati and Misool dialects on the one hand and the Waigeo dialects on the other. The latter have borrowed words from Biak and from SHWNG languages to the west. For example, while Salawati Maˈya has /kaˈbluti^{3}/ 'cold', all three of the Waigeo dialects have /maˈririn/, similar to Buli /mairiŋ/ (same meaning). Similarly, while Laganyan has /ˈwini^{3}m/ 'to drink', in keeping with the Salawati dialect, both the Wauyai and Kawe dialects have /dum/, again like Buli.

Second, the morphological prefixes that encode subject agreement on verbs are exactly the same in all five of the Maˈya dialects. As Dixon (1997:22) notes, morphological paradigms for verbs and pronouns are "very unlikely to be borrowed, under any circumstances".

The following subsections deal with the dialectal variation between the phonological systems of the various dialects of Maˈya.

2.3.1.2.1 Salawati dialect vs. Misool dialect

The only systematic difference between the phonological systems of Salawati and Misool Maˈya that I have been able to find has to do with the word prosodic system. In both of these dialects, words with lexical stress on the penultimate syllable have the same vowel in penultimate and final syllables. Such words now have the High toneme on the final syllable in the Salawati dialect, but the Rise in the Misool dialect. E.g., Salawati Maˈya /ˈlasa^{3}n/[15] 'sun' and /matˈmete^{3}m/ 'black' are /ˈlasa^{12}n/ and /matˈmete^{12}m/, respectively, in the Misool dialect (see also Table II.2).

[15] Note on transcription for Maˈya examples. Stress is marked by a ˈ preceding the stressed syllable. It is marked both in mono- and in polysyllabic words. Lexical tone is transcribed by a numerical code following the syllable with which the tone is associated: /^{3}/ refers to the High toneme, /^{12}/ to the Rise toneme. Maˈya word prosody is discussed in depth in Chapters 3 and 4.

Table II.2: Comparison of word forms in the Salawati, Misool, and Waigeo dialects. Words of Waigeo dialects are not marked for word prosody, because the three Waigeo dialects vary among themselves in this respect. Square brackets around a vowel indicate that it is realized in sentence-final position, but not in sentence-medial position (apocope).

English	Salawati	Misool	Waigeo (all)
bird	ˈmini^{3}	ˈmini^{12}	min[i]
banana	ˈtala^{3}	ˈtala^{12}	tal[a]
Wind	ˈmoro^{3}	ˈmoro^{12}	mor[o]
thunder	ˈlolo^{3}	ˈlolo^{12}	lol[o]
water	ˈwaya^{3}	ˈwaya^{12}	way[a]
light of weight	ˈmana^{3}	ˈmana^{12}	man[a]

2.3.1.2.2 Salawati & Misool vs. Waigeo dialects (Laganyan, Wauyai, Kawe)
In all three of the Waigeo dialects, when such words (with penultimate stress and the same vowel in penultimate and final syllables) have an open final syllable, then the final vowel is realized in prepausal position, but it is apocopated when the word appears in any other context (see Table II.2).

One can now hypothesize two analyses of how this situation emerged from pre-split Maˈya, the stage of the language that preceded the dialect split. On the one hand, the pre-split Maˈya forms of the words in Table II.2 may have had the final vowel, for example *mini ‘bird’ and *tala ‘banana’. According to this analysis, what we find in the Waigeo dialects is the synchronic loss of the final vowel (apocope) in prepausal contexts. Alternatively, the original stem may have been *min and *tal, and then a vowel addition rule (paragoge) has applied diachronically in the Salawati and Misool dialects, and synchronically in the Waigeo dialects. By taking into account the corresponding forms of other SH languages,[16] it appears that the first scenario is more likely to have actually taken place. For example, Buli and Sawai have /mani/ and /manɛ/, respectively (both meaning ‘bird’), and Buli has /tela/ ‘banana’. This implies that, in the development leading to Maˈya, we need to postulate a vowel assimilation rule in order to account for the first syllable vowels which these words have in all Maˈya dialects: so *mini and *tala in pre-split Maˈya. From this stage of reconstruction, the analysis guided by parsimony is the one with apocope of the final vowels in utterance-internal position in the Waigeo dialects. The alternative analysis involves postulating more diachronic phonological changes: e.g. from *mini to *min and *tala to *tal in pre-split Maˈya, and then back to /mini/ and /tala/ in the Salawati and Misool dialects, and context-conditioned paragoge /min[i]/ and /tal[a]/ in the Waigeo dialects. Because it requires more steps in diachronic development, this second analysis is a priori less attractive.

A minor point distinguishing all Waigeo dialects from the Misool and Salawati dialects involves a plosive-fricative alternation in alveolar phonemes. In a number of

[16] I will argue in § II.4 that all RA languages are part of the SH subgroup of SHWNG.

words /s/ and /ʃ/ in the Salawati and Misool dialects correspond to /t/ and /c/, respectively, in the Waigeo dialect (see examples in Table II.3). In this respect the Waigeo dialects follow the pattern of other South Halmahera: Buli has /totolaŋ/ (Maan 1940), and Sawai /tolɛn/ (Whisler & Whisler 1995) for 'to sit'. Van der Leeden (p.c.) says that the Maˈya variant of the village Sailolof on Salawati patterns with the Waigeo dialects in this respect.

Table II.3: Comparison of word forms in Salawati Maˈya, Misool Maˈya, and the Waigeo dialects (Laganyan, Wauyai and Kawe). The examples illustrate a between-dialect plosive-fricative alternation in alveolar phonemes.

English	Salawati	Misool	Laganyan	Wauyai	Kawe
sit	ˈsolo^{3}n	ˈsolo12n	ˈtolo^{3}n	tolon	tolon
run	ˈsiti^{3}	ˈsiti12	ˈtit[i^{3}]	tit[i]	tit[i]
areca nut	kamˈʃu^{3}	kamaˈʃu^{3}	amˈcu^{3}	kamcu	macu

2.3.1.2.3 Salawati & Misool dialects vs. the Laganyan dialect of Waigeo

Apart from the phenomena mentioned above that set apart all three of the Waigeo dialects from the Salawati and Misool dialects, there is dialectal variation that is not shared by all three of the Waigeo dialects. Salawati and Misool Maˈya /s/ corresponds to /h/ in many words of Laganyan: e.g. Salawati /ˈsia/ 'they' /ˈwoso^{3}l/ 'to stand', /bu^{3}s/ 'white' and /ˈbini^{3}s/ 'hot' are /ˈhia/, /ˈwoho^{3}l/, /bu^{3}h/, and /ˈbini^{3}h/, respectively, in Laganyan.

Second, a number of nouns of the Salawati and Misool dialects have a /ka-/ prefix. The words that have this noun marker in the Salawati and Misool dialects have the prefix /a-/ in the Laganyan dialect (see Table II.4). In a few cases, Laganyan has this /a-/ prefix while the word does not have /ka-/ in the Misool and Salawati dialects.

Table II.4: Comparison of word forms in Salawati, Laganyan, Wauyai and Kawe dialects. The examples illustrate /ka-/ or /a-/ prefixation. Reference data from Buli (Maan 1940), Sawai (Whisler & Whisler 1995), and reconstructed Proto-Malayo-Polynesian (R.A. Blust, p.c.).

English	Salawati	Laganyan	Wauyai	Kawe	reference
stone	kaˈpa^{12}t	aˈpa^{12}t	kapat	apat	pat (Buli)
leaf	kaˈlun(o)	aˈlun(o)	kalun	alun	wlu (Sawai)
one	katˈe^{12}m	aˈte12m	katem	atem	
tooth	kaˈlif	aˈlif(o)	kalif	alif	*lipen (PMP)
hole	kaˈle^{12}p	aˈlep[e^{3}]	kalep[e]	alep[e]	lop, lepa (Buli)
ground	ˈba^{12}t	aˈbat	kabat	abat	
flesh	ˈwana^{3}t	aˈwanat	kawanat	awanat	

2.3.1.2.4 Laganyan, Salawati & Misool vs. Wauyai and Kawe

The Wauyai and Kawe dialects differ from the Laganyan, Salawati and Misool variants by the fact that they do not use tone to mark lexical contrasts. Although I consistently perceived high pitch on a few monosyllabic words in the Wauyai and Kawe dialects, I did not find any minimal pair evidence for lexical tone. It may be that this high pitch is a remnant of a recently lost lexical tone system. In Chapter IV it is shown that the marking of lexical tone is least clear in the Laganyan dialect. It is likely that Wauyai and Kawe have gone further in this direction, to the extent that they lost previously existing tone contrasts.

Like in Laganyan, Kawe nouns and adjectives have the noun marking prefix /a-/ when the corresponding word of the Salawati and Misool dialects has the /ka-/ prefix (see Table II.4). Wauyai, on the other hand, features the /ka-/ prefix, just like the Salawati and Misool dialects do.

2.3.2. Matbat

2.3.2.1. Language situation

The Matbat language has between 1,000 and 1,500 native speakers, spread over eight mostly small villages along the coast of Misool (see Table II.5 and Figure II.4). As with most RA languages, the only data available are wordlists: wordlist number 50 in Wallace (1869), and three lists in the J.C. Anceaux collection (Smits & Voorhoeve 1992). Native speakers of Matbat and Ma'ya independently agree on the existence of three dialect areas for Matbat:

a) West Misool – the dialect of the villages Salafen and Aduwey;
b) Northeast Misool – the dialect of the villages Atkiri, Lenmalas, Polle and Tomolol;
c) Southeast Misool – the dialect of the villages Mage and Kapacol.

This distinction can be confirmed partly by a comparison of the lexical items collected in the village Mage (see appendix A) with the corresponding items collected in the villages Tomolol and Lenmalas in Smits & Voorhoeve (1992).

The presence of migrants from outside the Raja Ampat archipelago (see Table II.5) presents an obvious threat to the survival of Matbat in many villages. Because the villages are so small, even a small number of non-Matbat settlers can have a considerable impact on the language balance. Luckily, some villages appear to be inhabited almost exclusively by Matbat. The village where I collected my data, Mage, was one of them, and young and old were fluent in Matbat.

Table II.5: Villages on Misool, with their original language (lang.), number of inhabitants (size), and a note on the language situation. The information on which this table is based was collected from people in Fafanlap (Maʲya) and Mage (Matbat). The different sources agree independently.

Lang.	Village	Size	Remarks
Maˡya	Lilinta	800	Mostly Maˡya-speaking. Seat of *raja* of East-Misool.
	Gamta	250	Situated next to Matbat-speaking Mage.
	Fafanlap	800	Mostly Maˡya-speaking. Seat of *kapitan laut*.
	Yellu	1,000	Relatively recent settlement from Fafanlap. Many migrants, attracted by fishing grounds. Daily connection to Sorong by commercial fishing boat.
	Harapan Baru	300	Recent settlement.
	Waigama	800	Local administrative center of Misool, i.e., some government-employed migrants. Right next to Matbat-speaking Salafen.
Matbat	Salafen	150	Next to Waigama. Predominantly Matbat-speaking.
	Aduwey	250	Few migrants.
	Atkiri	350	Migrants from Tobelo, Buton and Biak.
	Lenmalas	800	Many migrants, from Buton, Timor, Tobelo.
	Polle	250	The village has two sections: Matbat and Buton.
	Tomolol	500	Some migrants (from Biak)
	Mage	125	No migrants. Right next to Gamta.
	Kapacol	75	No migrants.
Biga	Biga	350	Predominantly Biga-speaking.

2.3.2.2. Identifying wordlist 50 in Wallace (1869)

Wallace (1869) presents two wordlists of languages of Misool, which are introduced as follows:

> 49. Mysol (coast).–An island north of Ceram. Inhabitants Papuans with mixture of Moluccan Malays. Semi-civilized.
>
> 50. Mysol (interior).– Inhabitants true Papuans. Savages.
>
> [Wallace 1869(2):474]

No names are given for either of these languages. Wordlist 49 is Maˡya: most words in this list are identical to the ones in other wordlists of the language (van Peski 1914, van der Leeden 1983, 1993, Smits & Voorhoeve 1992). Evidence both of a linguistic and a non-linguistic nature suggests that wordlist 50 represents the Matbat

language. As for the non-linguistic evidence, there is the note in Wallace (1869), cited above: the language is used in the interior, and the inhabitants are physically Papuan. The Matbat match both of these criteria. They lived in the interior of Misool until around the middle of the 20th century, when they adopted christianity and moved to the coast.[17] Second, the Matbat are close to the Papuan physical type, and more so than the Maˈya are. And if we can interpret 'savages' to mean that they are neither christians nor muslims, then this also points towards the Matbat, who adhered to their own belief system until the middle of the 20th century. As for the linguistic evidence, the lexical items of wordlist 50 largely correspond to the ones I collected of the Matbat variant of the village Mage.[18] To a lesser extent, they also correspond to the wordlists in the Matbat wordlists in the J.C. Anceaux collection, which were collected in Lenmalas and Tomolol. This is illustrated in Table II.6.

Table II.6: A comparison of lexical data of Matbat from three sources: wordlist 50 in Wallace (1869), my data from the village Mage, and data from the village Tomolol (Smits & Voorhoeve 1992). The diacritics in the words from Mage denote tones (see Chapter V).

English	List 50 in Wallace	Mage	Tomolol (Smits & Voorhoeve)
black	Bít	kabi^{12}t	msiu
dog	Yem	ye^{21}m	yem
fire	Yap	ya^{3}p	yap
to go	Bo	bo1^{21}	bo
hot	Pelah	pla^{12}	binis (< Maˈya)
house	Dé	de^{3}	um (< Maˈya)
leaf	Idun	da^{21}n	pa
moon	Náh	na^{41}	na:a:
mother	Nin	ne^{3}n	-nen
oil	Menik	mni^{12}k	
road	Má	ma^{41}	ma
white	Boo	bu^{3}	bus
wood	Ei	ha^{3}y	hai
Yellow	Flo	flu^{12}ŋ	mani:

2.3.2.3. Interesting features of Matbat

Matbat is a tone language. In comparison with the tone system of Maˈya, lexical tone in Matbat is more complex, with five tonemes instead of three, and the distribution

[17] This was reported to me by villagers in Mage and Biga. It is line with similar developments on Salawati recorded in Polansky (1957).

[18] Wordlist 50 was collected by Wallace's assistant Charles Allen. A note in Wallace (1869) suggests that Allen collected the wordlist in the vicinity of Lilinta, in southeast Misool. This is the area of the Mage-Kapacol dialect, of which I collected the wordlist in appendix A.

of tonemes is less restricted than in Maˈya. An analysis of the lexical tone system of Matbat is presented in Chapter V.

In fact, Matbat's lexical tone feature is already apparent from wordlist 50 in Wallace (see Table II.6). A number of words in this list carry a diacritic accent (e.g. Má 'road'), the phonetic interpretation of which is not specified. Interestingly, whenever the item I have collected is the same as the item with an accent in Wallace's list, I have transcribed its toneme as High /^{3}/ or Extra High Fall /^{41}/. In other words, the accent in Wallace appears to reflect high pitch.

Just like many other tone languages (e.g. Utsat [Maddieson & Pang 1993]; Thai [Potisuk, Gandour & Harper 1996]), the Matbat lexicon is heavily monosyllabic. This feature becomes apparent when comparing the Austronesian lexical items with their reconstructed root or with the Maˈya cognate (see § VI.4.2). A considerable part of the Matbat vocabulary, however, does not derive from Austronesian. While all RA languages feature words of non-Austronesian origin, their number is particularly great in Matbat.

All RA languages of which I collected relevant data (i.e., Maˈya, Ambel, Biga, Matbat) inflect verbs for subject agreement, and both inalienable body parts and kinship terms for the possessor. The realization of the latter in Matbat is interesting, as it involves an infix and a vowel change (see Appendix B).

2.3.3. Biga

The Biga language is named after the single village where it is used, in southeast Misool. Biga is the third language of Misool, next to Maˈya and Matbat. This language has between 300 and 350 speakers. The J.C. Anceaux collection contains two wordlists of Biga, both of which were collected around the middle of the 20th century (Smits & Voorhoeve 1992). One of these wordlists, collected by Anceaux and Grace, has figured in the corpus Dyen (1965) used in his attempt to determine the genetic relations between the Austronesian languages by means of lexicostatistical analysis.[19]

A considerable proportion of the Biga vocabulary is similar to that of Maˈya (see Appendix A). This similarity is consistent with the Biga people's claim that they migrated to Misool from Waigeo, just as the Maˈya on Misool did. Furthermore, both Maˈya and Biga are clearly different from Matbat.[20]

Surprisingly, however, the words which do not bear resemblance to a word in Misool Maˈya in their phonological form, do not have a cognate in any of the Waigeo dialects of Maˈya. Instead, they are similar to words of the languages of land-oriented groups of Salawati and Waigeo (see Table II.7). And with them, the Biga share a number of features defining the interior-oriented social type: (a) they

[19] In Blust's discussion of Dyen's analysis, this language is erroneously located as follows: "Biga (Wakde island, South of Waigeo)" (Blust 1978:185).

[20] In Grimes (1996), Biga is listed as a synonym of Matbat. This is certainly incorrect.

are important sago producers for their local area; and (b) they did not embrace islam (see Appendix C).

Table II.7: Comparative lexical data of Biga and other RA languages. The words of 'Fiawat' were recorded in the interior-oriented village with the same name on Salawati. The status of this language is unclear (see § II.3.5). Square brackets around a vowel indicate that this vowel is realized in prepausal position, but not in sentence-medial position (apocope).

English	**Biga**	**Other RA language**	
heavy	maˈsun	meson	(Fiawat)
		maˈʃon[o^{3}]	(Laganyan)
betel fruit	utum	wotum	(Fiawat)
tongue	taˈleb(o)	telebey	(Fiawat)
mouth	saˈmo	hemo	(Fiawat)
leaf	kaˈmuy	emoy	(Fiawat)
nose	saˈnu(o)	henyu	(Fiawat)
hum. hair (head)	pa	pya	(Ambel)
areca nut	gey	ɟey	(Ambel)
night	maŋˈgam	gam	(Ambel)

2.3.4. Ambel

De Clercq (1893:174) notes that, next to Maˈya, which he refers to as 'the language of the four *rajas*', Ambel is the second original language of Waigeo. Although the speakers refer to themselves and their language as Ambel, both are identified in most sources as Amber (e.g. de Clercq 1893, Hartzler 1978, Smits & Voorhoeve 1992). The word /amber/ means 'stranger' in the Biak language, dialects of which are used in east and south Waigeo. The name of the Ambel ethnic group and language is obviously derived from this Biak word. The change from /amber/ to /ambel/ is in line with the hypothesis that Ambel is part of the SH section of SHWNG, because /l/ is the SH reflex of /*d,D,z,Z,l,r / in the SH languages (see § II.4.2). Ambel has also been referred to as Syam[21] (van der Leeden 1993), and Waigeo[22] (Grimes 1996).

[21] Syam (/ʃa^{12}m/) is the Maˈya form for Ambel /sam/ or /metˈsam/, the southern dialect of Ambel, which is closest to the Maˈya-speaking villages.

[22] Grimes lists two dialects for this language, Amber and Saonek. Amber is the actual name of the language; Saonek is an error. It is the name of the administrative center of South Waigeo, well beyond the area where Ambel is used. This listing may be based on Hartzler (1978), as it refers to a 1978 Summer Institute of Linguistics survey, and as it lists the same villages in the same order and spelling as Hartzler (1978) does. However, the name Waigeo is in disagreement with Hartzler (1978), who makes no mention of it, and only refers to the language as Amber.

Most Ambel-speaking villages are located in north Waigeo (see Figure II.4), on the island's north coast – Lamlam (also known as Kapadiri) and Kabare – and on the northern and eastern shores of Mayalibit Bay (Kabilol, Go, Wayfoy). Kalitoko and Warsamdin are located more to the south, Kalitoko on the southeast shore of Mayalibit Bay, and Warsamdin at the entrance of the bay.[23]

Ambel has two dialects, Metnyo and Metsam. The division between the two dialects corresponds with the geographic spreading of villages. Metnyo is used in the northern villages (Kabilol, Go, Wayfoy, Lamlam, and Kabare), and Metsam in the villages located at the south end of Mayalibit Bay: Kalitoko and Warsamdin. Most of these villages are small, with no more than 150 inhabitants. In Warsamdin and Kabare, the Ambel share the village with Biak people (see § II.3.8), and as a consequence these villages are bigger. There may also be Beser people in the other Ambel-speaking villages (Hartzler 1978); both groups are christian, so they can intermarry.

To speakers of the Metnyo dialect, Metsam intonation is melodious, with the sentence melody going up and down. This makes sense, because the Metsam-speaking villages are located somewhat apart from the other Ambel villages, and close to Lupintol and Arway, which speak the tone language Maˈya (Laganyan dialect).

The Ambel language is clearly different from Maˈya in terms of its lexicon (see appendix A) and morphology (appendix B). According to native speakers of both Ambel and Maˈya, these languages are not mutually intelligible. Ambel is certainly not a tone language. Likewise, it also bears little lexical resemblance to the Biak dialects of east Waigeo, although Amber has loaned a number of lexical items, such as /abris/ 'grass' (< Biak). Like Matbat, a large proportion of the Ambel lexicon is not derived from Austronesian roots.

2.3.5. The interior-oriented villages of Salawati: 0, 1 or 2 languages?

The language situation of the interior-oriented villages of Salawati is unclear.[24] The various primary sources each give a different account. While Polansky (1957) distinguishes two languages for these villages in his language overview, van der Leeden (1993) writes there is only one. In the J.C. Anceaux collection of wordlists (Smits & Voorhoeve 1992), the wordlists collected in interior-oriented villages are classified as variants of Maˈya. My own data, consisting of a Swadesh-list (but no

[23] Both Kalitoko and Warsamdin have been established relatively recently, and they have a common origin in the village of Lensok, which is mentioned in Kamma (1948). After an argument, part of the population of Lensok moved to Selegof, while the other part moved to Warsamdin. Later, those living in Selegof moved again to Kalitoko. Hartzler (1978) still mentions Selegof, which implies that the move took place after 1978. Both Lensok and Selegof were located not far from present Kalitoko. It is not uncommon in the RA for people to relocate their village. For example, Yefnu recently moved to Arway after a disease; Waigama moved various times during the 19th century (de Clercq 1893).

[24] The distinction between sea- and land oriented groups is motivated in Appendix C.

grammar notes) collected in the village of Fiawat are insufficient to solve the controversy.

In an unpublished official report on the situation of Salawati, the Dutch colonial administrator Polansky includes a detailed overview on the language situation. Polansky writes that two different languages are used in the interior-oriented villages of Salawati: Kawit and Tipin/Metli. Kawit is the language of the groups that used to live on the banks of the Sapran and Salawatlol rivers (west and south Salawati, respectively). Tipin/Metli is the language of the interior-oriented villages of north Salawati. Polansky reports that there is some disagreement between villages on the name of this language. While in the villages near Sagewin Straits on the north coast (Sagewin, Solol, Waipeleh and Kalwal) they call it Tipin, the interior-oriented population of northeast Salawati (Kapatlap, Mocu, Fiawat, Kalobo and Pakon villages) calls it Metli, which means 'interior-oriented people'. This Tipin/Metli language is referred to as Banlol in the Ma'ya villages of Salawati (Samate and Sailolof).

By the time van der Leeden conducted his fieldwork research on Salawati (1979-1983) all the interior-oriented villages had moved to the coast. Various interior-oriented villages moved to the vicinity of the Ma'ya-speaking villages, Sailolof and Samate, and others moved to the Kalobo transmigration village. In his account of the language situation of the interior-oriented villages, van der Leeden (1993) distinguishes Kawit, Tipin and Butleh. Tipin and Butleh broadly correspond to the Tipin and Metli areas of Polansky, corresponding to the Sagewin Straits area and northeast Salawati, respectively. But while Polansky reports that the villages in both areas use the same dialect, but refer to it with a different name, van der Leeden mentions Tipin and Butleh as distinct dialects. An important difference between Polansky (1957) and van der Leeden (1993) is that while the former considers Kawit and Tipin/Metli as different languages, the latter considers Kawit, Butleh and Tipin as three dialects of a single language. Van der Leeden (1993:10) also writes that speakers of Ma'ya "readily understand Butleh".

In a third classification, the J.C. Anceaux collection (Smits & Voorhoeve 1992) lists the wordlists collected in the interior-oriented villages of Salawati as representing dialects of Ma'ya.

Finally, both Wurm (1994) and Grimes (1996) list Maden as a language of Salawati. This name appears in no other source, apart from Polansky (1957), who writes that people in Sakabu, a Kawit village on the banks of the Salawatlol river in south Salawati, claim that the Moi people of the New Guinea mainland call them 'Madin' (Polansky 1957:8). Grimes list Sapran as an alternative name of this language – this is the name of an interior-oriented village in west Salawati, on the banks of the river with the same name. In summary, it appears that Maden can be equated with the Kawit language or dialect of the southern part of Salawati.

While a lot of questions remain on the language situation of Salawati, the disagreement about the language situation of the interior-oriented villages of Salawati outlined above is in itself revealing. It suggests that the difference both

among the languages/dialects of various villages, and between these and the neighboring Ma'ya language is not very great.
Whatever the actual language situation of Salawati may have been in the past, it is changing rapidly. In the village of Fiawat (northeast Salawati), children and young adults could not speak the language of their parents or grandparents. In this and probably other interior-oriented villages as well, the dialect(s) or language(s) of the interior of Salawati are threatened by extinction.

2.3.6. Other Raja Ampat languages: Bata, Gebe and As

There are a few more original RA languages: Bata, Gebe, and As. I have not collected data of these languages myself, but I will discuss them on the basis of published and unpublished sources.

Both Polansky (1957) and van der Leeden (1993) write that the people of Batanta, an island between Waigeo and Salawati, have their own language, and van der Leeden refers to it as Bata. While Polansky mentions Wailebet and Yenenas as the villages where this language is used, van der Leeden writes that its speakers lived concentrated in the village Yenenas at the time of his fieldwork research in the area (1979-1983). Van der Leeden also writes that Bata and Ma'ya are not mutually intelligible. It is unclear whether Bata is extinct by now or not. Bata is the only Raja Ampat language of which there is no wordlist in the J.C. Anceaux collection (Smits & Voorhoeve 1992), and I have not come across a wordlist of it in any other source.

The Gebe language is used on the Gebe islands, between Waigeo and Halmahera, and on the island Gag, off the southwest coast of Waigeo. Although they are nowadays part of Indonesia's Moluccas Province, the Gebe islands are located closer to Waigeo than to Halmahera. The settlement of Gebe people on Gag is testimony to the connection with the RA islands. A wordlist of Minyaifuin, as the Gebe dialect of Gag is called, is included in Smits & Voorhoeve (1992). It is unclear whether Gebe is more similar to the RA languages or to the SHWNG languages of south Halmahera. While Grimes (1996) lists Gebe as a RA language (see Figure II.5B), van der Leeden (1993:10) hypothesizes that it is "an offshoot of the Patani language from southeastern Halmahera".

As is the language of Asbaken (also As), Mega and Malaukarta, three villages on the north coast of the Bird's Head of New Guinea. The number of speakers of the As language is small, on the order of a few hundreds (K. Berry, p.c.). A wordlist of this language is listed in Smits & Voorhoeve (1992). It may be that As is a dialect of Ma'ya, with some loan words from Papuan languages of the Bird's Head. Grimes, quoting an unpublished SIL survey carried out in 1988, mentions that lexical similarity between As and "some dialects on Misool Island" (Grimes 1996) – presumably Misool Ma'ya – stands at 60 percent.

If this is so, it is unclear how this RA language came to be used outside the RA archipelago. Importantly, the As-speaking villages are located in the part of coast of the Bird's Head that was controlled by the *raja* of Salawati until the end of the 19th century (see Appendix C). They played a role as intermediaries between political,

commercial and cultural influences from the outside and the Papuan groups living in the interior of the Bird's Head (de Clercq 1893, Haenen 1991). Haenen (1991) suggests that its speakers originally came from Biak. This is unlikely, for a number of reasons:

- In older sources, such as de Clercq (1893), As is not mentioned among the nine villages of Biak origin on the north coast of the Bird's Head and in the RA area.
- Unlike the Biak people but similar to the Maˈya and the Austronesians of South Halmahera, they are not frizzy-haired (K. Berry, p.c.).
- The linguistic evidence suggests that theirs is a RA language rather than a language of Cendrawasih Bay (Smits & Voorhoeve 1992, Grimes 1996).

It therefore appears more likely that the As people came from Salawati, South Halmahera (Robidé van der Aa 1879:58, de Clercq 1893) or Gebe (K. Berry, p.c.)

2.3.7. Malay / Indonesian

Dialects of Malay constitute the most important external influence in the current language situation of the RA archipelago. Already at the time of the European colonization of insular South East Asia in the 15th and 16th centuries, Malay dialects fulfilled the function of lingua franca in the region of what is now Indonesia, Malaysia, Brunei and the Philippines (Collins 1998). Under the Dutch colonization, Malay continued to gain ground, partly because of its adoption by the Dutch in education and administration (Collins 1998). Over time, the use of Malay dialects as a lingua franca became one of the defining characteristics of what is now Indonesia, so that in the middle of the nineteenth century, the biologist Wallace could refer to what is now Indonesia by the name 'the Malay archipelago' (Wallace 1869). The importance of Malay as a rare common feature in an otherwise diverse patchwork of ethnic groups, religions, and languages, did not escape the notice of the Indonesian nationalists. After Indonesian independence Malay was adopted as the national language, now renamed 'Indonesian'. The status of national language ensured a continuing spread of Indonesian through education and the media. Nowadays, practically all Indonesians speak Indonesian or another dialect of Malay, either as a first or as a second language.

In the Raja Ampat archipelago, everybody is fluent in Malay. While school children learn the national standard at school, it is a regional dialect of Malay that is commonly used. Like all regional Malay dialects of Eastern Indonesia – e.g. van Minde (1997) on Ambonese Malay, and Steinhauer (1983) on Kupang Malay – this variant features less derivational and flectional morphology than the national standard, and is therefore easier to learn. It shares a number of similarities with Ambonese Malay, the Malay variant of the neighboring Moluccas Province. For example, the Malay dialect used in the RA archipelago features the same negative construction (possessor possessive_particle possessed) as Ambonese Malay, and it also shares some pronouns such as /ˈdoraŋ/ 'they'. In villages where original RA languages are spoken, this variant of Malay functions as a second language, used in

all contacts with speakers of other languages. Fifty years ago, this function of lingua franca was fulfilled predominantly by Ma'ya (Polansky 1957, van der Leeden 1993).

In some RA villages, however, Malay has become the first language. Cases in point are melting pot situations like the transmigration village Kalobo on Salawati, and the diverse population of Yellu on Misool. Also, in the village Fiawat on Salawati, Malay is the first language of people younger than approximately 35 years. Here Malay has been adopted as a first language without the pressure of a multilingual situation. The importance of Malay in the RA archipelago is bound to continue to increase, as the arrival of settlers from elsewhere in Indonesian creates situations where speakers of original RA languages are likely to switch to Malay.

2.3.8. Other non-RA languages used in the Raja Ampat archipelago

People whose ancestors left from the Cendrawasih Bay area constitute the largest group of migrants in the RA archipelago. The original population of the RA islands refers to them as Biak or Beser. Biak is the place of origin of the majority of these settlers; Beser is the name of the Biak settlement on the island Gaman, south of Waigeo. A variety of dialects of Biak are used on the shores of the eastern peninsula of Waigeo, and on the islands Gaman and Batanta (south of Waigeo). On Waigeo, the Biak people also share two villages with the Ambel: Kabere and Warsamdin. People from Cendrawasih Bay have also migrated to Yefman (near Sorong), Misool, and Kofiau. Van der Leeden (1993) draws the distinction between the Beser dialect of the villages of groups that migrated from Biak centuries ago and developed away from it in the meanwhile, and the 'proper Biak' of recent settlements, e.g. on Batanta. In particular on Waigeo, these dialects of Biak have a clear impact on the original RA languages (Hartzler 1978). A number of wordlists of the dialects of Biak on Waigeo can be found in Smits & Voorhoeve (1992), and Hartzler (1978) collected shorter lists.

The village of Duriankari (also known as Yefpan), on the southern tip of Salawati, has or used to have its own language, clearly distinct from neighboring languages (Polansky 1957, Voorhoeve 1975). It is a non-Austronesian or Papuan language, classified by Voorhoeve (1975) as a member of the Inanwatan family, the only other member of which is the Inanwatan language. The Inanwatan language is spoken in the village of the same name on the south coast of the Bird's Head of New Guinea, in the village Seget at the southern entrance of Sele Strait, and in the Jalan Ferry area in Sorong (de Vries 1998). Polansky (1957) writes that the people of Duriankari claim to hail from the Kalabra-area on the south coast of the Bird's Head of New Guinea. As early as 1957, Polansky notes that the Duriankari language is under pressure, as its native speakers switch to the Moi language, and he reports that children are no longer fluent in Duriankari. De Vries (1998), based on information collected from Inanwatan speakers in Seget, reports that the Duriankari language is probably extinct by now.

Moi is the Papuan language of the ethnic group with the same name. Originally from the part of the Bird's Head opposite Salawati, groups of Moi have migrated to

eastern and southern Salawati. Polansky (1957) and van der Leeden (1993) both distinguish the Mosenah, a subgroup of the Moi that has integrated with the interior-oriented groups of Salawati. Their villages are Yefbo and Waliam. According to Polansky (1957), the Mosenah dialect is quite different from mainland Moi.

While Biak, Duriankari and Moi communities have been in the RA archipelago for at least a 100 years, the languages of many other settlers are new in the area. Among others, there is non-Austronesian Tobelorese (from north Halmahera) in some Matbat villages, and the Butonese and Buginese languages of Sulawesi.

2.3.9. Conclusion: the language situation of the RA archipelago

The language situation of Misool is clear – there are three original RA languages here: Matbat, Maʲya, and Biga. While there is considerable lexical similarity between Maʲya and Biga, both of these are clearly different from Matbat, both in terms of the lexicon and of structural properties (see Appendices A&B).

With respect to Waigeo, both Wurm (1994) and Grimes (1996) list Kawe and Laganyan as separate languages, and Wurm (1994) does not distinguish Ambel. In my interpretation, which broadly corresponds with Smits & Voorhoeve (1992), both Kawe and Laganyan, together with Wauyai, are the Waigeo dialects of Maʲya. A comparison between the phonological systems of these dialects revealed that variation is limited to a small number of well-defined differences. The analysis of Kawe, Wauyai and Laganyan as dialects of Maʲya is also supported by mutual intelligibility, lexical similarity (see appendix A), and the fact that all Maʲya dialects share the same inflectional affixes marking subject agreement on verbs.

The situation of the original RA languages on Salawati remains the most confusing. The dialect(s)/ language(s) of the interior-oriented groups of Salawati have been classified as dialects of Maʲya (Smits & Voorhoeve 1992), as two dialects of a single language (van der Leeden 1993), and as two separate languages (Polansky 1957). A comprehensive survey of the language situation of Salawati is required to solve this issue. Such a survey may be unable to reconstruct the distinctions that existed before groups moved to the coast. For example, the Kawit, who are identified as having their own language (Polansky 1957) or dialect (van der Leeden 1993), moved to the villages of groups that speak other languages (Sailolof, Duriankari, Kalobo). In any case, this confusion suggests that the difference between the dialect(s)/language(s) themselves, and between them and Maʲya is not clear-cut, and therefore small.

Our knowledge of Gebe and As is limited to wordlists (Smits & Voorhoeve 1992). Still, these wordlists clearly show that these are RA languages, closely related to Maʲya. Of the Bata language of Batanta only the name is known. Hopefully, there are data of this language in as yet unpublished collections, because Bata is either close to extinction or already lost. In general, the original RA languages are threatened with extinction under the growing influence of Malay in the area.

This interpretation of the language situation of the RA archipelago is summarized in the map in Figure II.4.[25]

2.4. The genetic classification of the Raja Ampat languages

2.4.1. Previous work

The South Halmahera-West New Guinea (SHWNG) subgroup comprises all Austronesian languages of the southern half of Halmahera, Cendrawasih Bay, the Raja Ampat archipelago, and some Austronesian languages of the Southwest coast of New Guinea. As mentioned above, it was Blust (1978) who corroborated this hypothesized subgroup of Austronesian, with evidence from phonological innovations shared by a representative set of SHWNG languages.

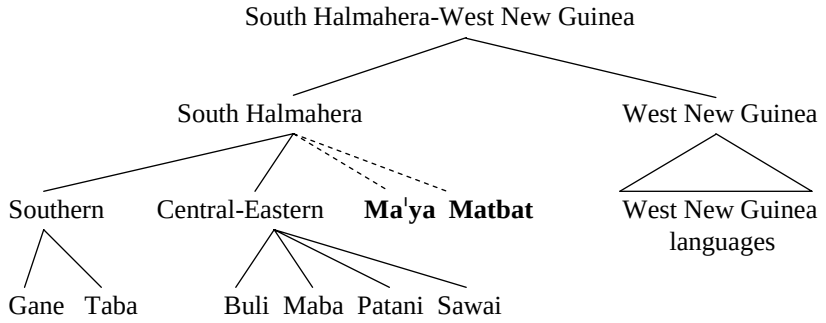
Although all studies agree that the RA languages are part of the SHWNG subgroup, there is no consensus on their position within SHWNG. Like the issue of the number of RA languages, this controversy about their genetic classification stems from a lack of knowledge of the RA languages rather than from conflicting theories. While Blust (1978) classified two RA languages as part of the South Halmahera (SH) subgroup, Grimes (1996) places all RA languages within the West New Guinea (WNG) subgroup. Van der Leeden (1993) and Wurm (1994), finally, hypothesize that the RA languages constitute a first-order subgroup under the SHWNG node.

In his analysis of the SHWNG subgroup of Austronesian (see Figure II.5A), Blust (1978) included two languages of Misool, the southern island of the Raja Ampat archipelago. These languages were not identified by name, but on the basis of lexical items from the wordlists Blust uses (Wallace 1869, van Peski 1914), they can be identified as Ma'ya and Matbat (see § II.3.2.2). Both of these languages show evidence of the phonological processes that distinguish the SH languages from the WNG languages (Blust 1978). Also, Blust demonstrates that many lexical items of the language that can be identified as Ma'ya are exclusively shared with SH languages of South Halmahera. On the basis of this phonological and lexical evidence, Blust concludes that they are also part of the South Halmahera subgroup of SHWNG. Although his is the best-motivated hypothesis on the classification of the RA languages, Blust (1978) leaves a number of questions unanswered. First, he did not specify the position of the two Misool languages (Ma'ya and Matbat) in the SH subgroup: first-ordered under the SH node, or in the Central-Eastern group. Second, by limiting his hypothesis of membership of the SH subgroup to the two languages of Misool, the issue of the location of the boundary between the SH and the WNG languages remains unresolved. That is, it is unclear whether the RA

[25] The map in Figure II.4 does not show As, because the As-speaking villages (Asbaken, Mega, Malaukarta) are located on the New Guinea mainland (see Figure II.3).

languages other than those taken into account in Blust (1978) belong to the SH or the WNG subgroups. The unclear position of the RA languages in Blust (1978) is evident from the naming of the SH subgroup of SHWNG. Blust did not name this subgroup South Halmahera-Raja Ampat, and by not doing so suggested that the majority of the SH languages are located on south Halmahera.

A. Blust (1978)



B. Grimes (1996)

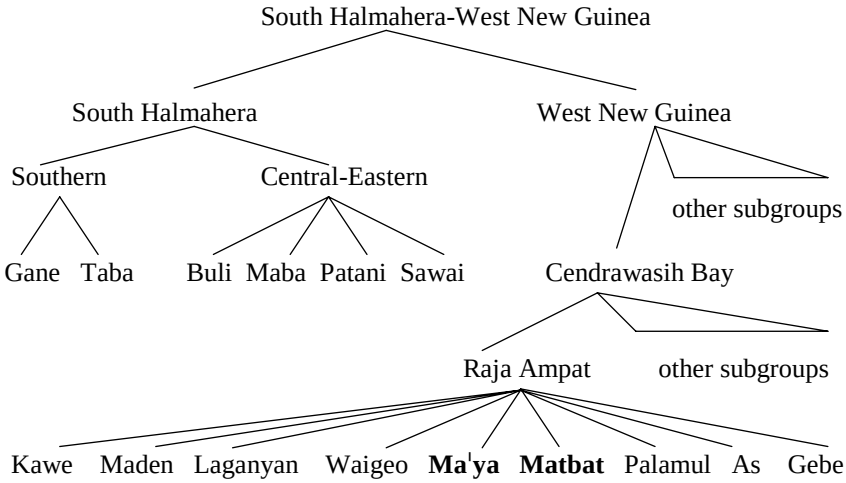


Figure II.5A&B: The position of the RA languages within the SHWNG subgroup of Austronesian according to Blust (1978) and Grimes (1996). Irrelevant parts are marked by triangles. The unclear position of Ma'ya and Matbat within the SH branch in Blust (1978) is marked by interrupted dependency lines.

In the Ethnologue overview of the world's languages (Grimes 1996), the RA languages constitute a second-order subgroup – labeled 'Raja Ampat' – under the

WNG branch of SHWNG (see Figure II.5B). The data on which the coverage of the RA languages in Ethnologue is based come from the unpublished reports of surveys by teams of the Summer Institute Linguistics, and from Wurm & Hattori (1981). It is unclear, however, what phonological or other evidence the genetic classification of the RA languages under the WNG branch of SHWNG is based on, apart from the mere geographic fact that the Raja Ampat archipelago is located closer to New Guinea than to Halmahera.

Van der Leeden (1993) proposes to classify the original languages of the Raja Ampat archipelago as a first-order subgroup of SHWNG. This hypothesis is based on the occurrence of lexical tone in Ma'ya, and on the possessive suffixes on names of inalienable body parts and kinship terms. Van der Leeden suggests that these features distinguish the RA languages from the other languages in the SHWNG subgroup. Wurm (1994) takes the same approach, classifying the Raja Ampat languages as first-order subgroup of SHWNG, on a par with the South Halmahera, Bomberai and Cendrawasih Bay subgroups distinguished in his classification. However, the arguments adduced in support of this hypothesis are weak. First, not all RA languages are tone languages: Ambel, for example, definitely is not. As for the morphological marking of inalienable body parts and kinship terms, this phenomenon has also been reported for Taba (Collins 1982) and Sawai (Whisler 1992), two members of the SH subgroup of SHWNG. In short, none of these linguistic features sets apart the RA languages from the rest of the SHWNG subgroup.

In summary, of all three of the proposed classifications of the RA languages, the one by Blust (1978) is best supported by empirical evidence. However, this classification only accounts for the position of two languages of Misool. In the following subsection, I will argue that all RA languages are part of the SH subgroup of SHWNG.

2.4.2. A RASH hypothesis: all RA languages belong to SH branch of SHWNG

On the basis of an analysis of cognate sets, Blust (1978) identified a number of sound changes that set apart the SH languages from the WNG languages. In these sound changes, reconstructed phonemes of Proto-Austronesian are reflected differently in the SH as opposed to the WNG languages (see Table II.8).

Table II.8: Two sound changes that have taken place in the development from Proto-SHWNG to its daughter languages (Blust 1978).

Proto-Austronesian phonemes	**Development in daughter languages:**	
	South Halmahera	**West New Guinea**
*d,D,z,Z,l,r	/l/	/r/
*R	Ø	/r/

Blust notes that the two Misool languages in his data set, which can be identified as Matbat and Maˈya, pattern along with the language of South Halmahera, and are therefore part of the SH subgroup of SHWNG. It is now possible to extend Blust's hypothesis to all RA languages by demonstrating that they all underwent the changes that define the SH subgroup. Evidence is presented below in Table II.9.[26]

The evidence from phonological processes suggests that all RA languages underwent the sound changes characteristic for the SH branch of the SHWNG languages. There is, of course, the possibility that some RA languages borrowed these words from another RA language. For example, Matbat could be a WNG language and reflect PAN *d,D,z,Z,l,r as /r/, but have borrowed the above reflexes with /l/ from e.g. Maˈya. In particular for the numerals, such borrowing would not be unlikely.[27] However, this danger is limited to Ambel – in all the other RA languages, the phoneme /r/ either has a very low functional load (e.g. Maˈya), or it is absent altogether (e.g. Matbat). Also, if a language only has either /r/ or /l/, then it is likely to replace the phoneme it does not have in loan words by the one it does have. For example, Kijne notes that Biak /keret/ 'family, clan' is a loan from Maˈya, which has /ɟilet/ (same meaning) (Reesink 1998) – Biak does not have the phoneme /l/ (Steinhauer 1985). Importantly, there is no counter-evidence, where RA languages other than Ambel pattern along with the WNG languages in function of the above sound changes.

For Ambel, the sound change heuristic employed to determine whether it is a SH or WNG language, does not yield an unambiguous answer. While Ambel has the SH reflex of the sound changes in most words, it has the WNG reflex in others. The Ambel villages are located between Maˈya villages on the one side and Biak villages on the other, and the Ambel share two villages with Biak people (see Appendix C). As a consequence, either the words with a SH reflex or those with a WNG reflex could have been borrowed. Although the evidence is limited, I hypothesize here that it is the words with the WNG reflex have been borrowed, and that Ambel is a SH language. This hypothesis is supported by the fact that the cases where Ambel words pattern with the SH languages outnumber those where they pattern with the WNG languages.

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[26] Abbreviations and sources: Sawai [Sw] (Whisler & Whisler 1994), Buli [Bl] (Maan 1940), Taba [Tb] (Collins 1982, Bowden 1997), Biak [Bk], Ron [Rn], Dusner [Ds], (Blust 1978, Smits & Voorhoeve 1992); Mor [Mr] (Laycock 1978). Minyaifuin [Mn], As (Smits & Voorhoeve 1992); Fiawat [Fw], Ambel [Am] Biga [Bg], Matbat [Mb] from Appendix A and from Smits & Voorhoeve (1992). Maˈya [My] (Salawati dialect unless indicated otherwise) from Appendix A and from van der Leeden (ms. 1). Proto-Austronesian, [PAN], Proto-Malayo-Polynesian [PMP], (Blust 1978, 1985, ms.; Zorc 1995).

[27] Moi, a Papuan language on the mainland of New Guinea, has borrowed numerals from an Austronesian language (Menick 1995).

Table II.9: Evidence of the sound changes listed in Table II.8. Data from SHWNG languages of South Halmahera, RA islands, and West New Guinea (WNG).

	S. Halmahera	**RA islands**	**WNG**
***d,D,z,Z,l,r**			
*DuSa ‘two’	Bl /lu/, Tb /plu/	My /ˈlu^{3}/, Mb /lu^{3}/, Am /low/	Bk /suru/
*laŋaw ‘fly (n.)’	Bl /laŋ/	Mn /laŋ/, As lenaŋ/, Am /lan,la:n/	Bk /ran/
*telu ‘three’	Bl /tol/, Tb /ptol/, Sw /pɛtol/	My /ˈto^{3}l/, Bg /tol/, Mb /to^{3}l/ Am /tul/	Bk /kior/
*lima ‘five’	Tb /plim/, Bl /lim/	Bg, Am, As /lim/, My /ˈli^{3}m/	Bk /rim/
*delek ‘thunder’		My /ˈlolo^{3}/, Mn, Bg, Am /lolo/	
? ‘round’		My /kasˈpupu^{3}l/, Am /aŋkapupur/	
? ‘feather’		My /kaˈlun(-o)/, Wauyai My /kapnun/, Am /kaprun/	Bk, Ds /man-bur/
*zalan ‘road’	Bl /laliŋ/	My /ˈlili^{3}n/	Mr /rarin/
***R**			
*qateluR ‘egg’	Bl, Tb /tolo/	Bg /tolo/, My /ˈto^{12}l/, Am /talo/, As /ntalo/	Bk /pnor/
*Rebek ‘fly’	Bl, Tb /opa/	Mn, As /-opa/, Bg /obo/, My /-ˈopo^{3}/, Am /apo/	Bk /rob/
*Rumaq ‘house’		My /u^{3}m/, Bg, Mn, As /um/	Bk, Rn, Ds /rum/
*wahiR ‘water’	Tb /woya/, My /waya/	My /ˈwaya^{3}/, Bg, Fw /wey/, Am /we/	Biak /war/
*apuR ‘betel quid’	Bl /yafi/	My /ˈlafi^{3}/, Am /ahar/[28]	Rn /afer/, Ds /aper/

The above evidence supports the hypothesis that all RA languages are part of the South Halmahera (SH) branch of SHWNG. In the light of this evidence, the current name of this branch is unclear, as it suggests that SH languages are located mainly

[28] In a number of words, Ambel /h/ corresponds to /f/ in other SHWNG languages. Bowden (1997) reports the same phenomenon for Taba. Examples: My /ˈfo^{12}n/, Mb /fo^{3}n/, Am /an-hon/, Tb /mhon/ ‘full’; Bl /fia/, My /ˈfi^{3}/, Mb /ˈfi^{3}/, Am /ahey/, Tb /hia/ ‘good’.

on South Halmahera. In fact, the RA languages constitute at least as many SH languages as there are in South Halmahera, and variation may be more substantial among the RA languages. Therefore I propose that the South Halmahera branch of SHWNG be renamed Raja Ampat-South Halmahera (RASH).

2.4.3. The relative value of genetic classification based on vocabulary alone

Various scholars, among others Dixon (1997) and Foley (1998), have criticized the genetic classification of languages on the basis of (a small part of) their lexicon only. Foley (1998) notes that although a language may be classified as Austronesian on the basis of a small number of cognates, structural properties may support an alternative non-Austronesian classification. It has been noted (Blust 1985) that the SHWNG languages have retained a smaller part of the Proto-Austronesian lexicon than languages of the other subgroups of Austronesian have. Blust suggests that this may be attributed to the contact with the Papuan languages. All RA languages reflect this relatively low retention of Austronesian vocabulary, and the phenomenon is particularly strong in Matbat and Ambel (see Appendix A; Smits & Voorhoeve 1992). From this perspective, the question of the relation between the RA languages and the Papuan languages may be more interesting than the issue of position of the RA languages within the Austronesian language family. The presence of typically Papuan features such as lexical tone in Ma'ya and Matbat suggests a strong Papuan influence, either as a substrate or through language contact. Further research on RA languages, in particular Matbat and Ambel, may reveal more typically Papuan morphosyntactic characteristics, at odds with a straightforward Austronesian classification.

2.5. Summary

In this chapter, I presented background information on the languages of the RA archipelago, on the basis of previous sources and of my own fieldwork data. The language situations for Misool and Waigeo are clear. On Misool, there are Ma'ya, Biga and Matbat; on Waigeo, there is Ambel and three dialects of Ma'ya. The language situation of Salawati remains unclear for lack of data: there may be two languages there, or, alternatively, a number of dialects of Ma'ya. The lack of agreement between sources on the status of these languages or dialects suggests that, in relation to Ma'ya, they straddle the boundary between a language and a dialect.

As for the genetic classification of the RA languages, an inspection of the phonological evidence leaves no doubt about the fact that these languages are more closely related to the SHWNG languages of South Halmahera than to those of Cendrawasih Bay. This conclusion is consistent with Blust (1978), who groups Ma'ya and Matbat with the SH languages. The phonological evidence presented above shows that the hypothesis presented in Blust (1978) can be extended to all RA languages. In order to reflect the considerable proportion of Raja Ampat languages

in this subgroup of SHWNG, I have proposed that it be referred to as ‘Raja Ampat-South Halmahera’ (RASH).

3 Lexically contrastive stress and lexical tone in Ma'ya[29]

3.1. Introduction

In this chapter I will argue that the Austronesian language Ma'ya features a hybrid word prosodic system, with both lexically contrastive stress and lexical tone. But since words like tone, stress and accent are used with a variety of meanings, I will begin with making clear how they are used in this and the following chapters (§ III.1.1). The discussion then moves on to hybrid word prosodic systems (§ III.1.2), the actual focus of this chapter. In § III.2 and § III.3 I support the hypothesis that the tone language Ma'ya has contrastive lexical stress with phonological and phonetic evidence, respectively.

3.1.1. A typology of word-prosodic features

In a lexical tone system, fundamental frequency (f_0)[30] marks a paradigmatic contrast. This means that one toneme contrasts with other tonemes from a set that could have been marked on the same domain – most often the syllable. Iau, for example, is an 8-toneme language used in New Guinea (Bateman 1990). A Low level tone on /be/ 'fire' encodes a lexical contrast with other tones that could have been marked on the same syllable (see Table III.1). It is not unusual for tone languages to feature more than two tonemes.

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[29] This chapter will appear as B. Remijsen (2002) 'Lexically contrastive stress accent and lexical tone in Ma'ya', in C. Gussenhoven & N. Warner (eds.) *Laboratory Phonology VII*. Berlin/New York: Mouton de Gruyter. Non-final versions have been presented in a seminar at the Holland Institute of Generative Linguistics in Leiden (November 1999), at a postgraduate workshop at the University of Edinburgh (May 2000), and the Seventh Laboratory Phonology conference in Nijmegen (June 2000).

[30] The acoustic correlates of word prosodic features (duration, f0, vowel quality and intensity-related parameters) will be introduced in § III.3.2.4.

Table III.1: A classification of word prosodic features, based on Trubetzkoy (1939) and Beckman (1986). Iau example from Bateman (1990:35); Una example from Donohue (1997:367).

Phonology					
Lexical tone: paradigmatic contrast (e.g. Iau)		**Lexical accent: culminative and delimitative; if distinctive, the contrast is syntagmatic.**			
		Lexical pitch-accent (e.g. Una)		**Lexical stress** (e.g. English)	
Tone	Example	Accent	Example	Accent	Example
Low level	be ‘fire’	penult	ˈbita ‘truly’	penult	ˈpervert
High rise	be ‘snake’	final	biˈta ‘frogs’	final	perˈvert
Low rise	be ‘path’	ante-penult	ˈkʉnkalya ‘joint’		
Mid fall	be ‘flower’	penult	kʉnˈkalya ‘pimple’		
Encoding: f_0				**Encoding: parameters other than f_0**	
Phonetics					

Lexical accent systems are structurally different from lexical tone systems. Whereas lexical tone systems are by definition paradigmatically contrastive, lexical accent in many cases is not distinctive (= lexically contrastive) at all. Instead, the functions that are characteristic for the accent are the culminative and the delimitative functions (Trubetzkoy 1939). The culminative function implies that one unit – in this case the mora or the syllable – stands out from among the other units within the prosodic domain – in this case the word. Because lexical accent is culminative, the value for the feature that distinguishes the syllable that stands out – [+accent] – automatically determines the value for this feature in the other syllables: [-accent]. The delimitative function implies that when the position of the accent is predictable, then it allows the listener to infer the position of the word boundary. In Czech, for example, the accent is associated with first syllable of the word, and as a consequence it constitutes a word boundary cue for the native listener.

When an accentual contrast is distinctive, then the lexical contrast is of a syntagmatic nature. As noted by Beckman (1986), this follows from the culminative function. Because the accented syllable stands out among unaccented syllables, it can only be distinctive by a difference in the position of the accent in the word. The examples in Table III.1 from the Una language of New Guinea and English, both accent systems, illustrate this point.

The distinction between lexical tone and lexical accent systems as it is made here, following Trubetzkoy (1939), is based entirely on the structure of the prosodic contrast. As for the phonetic marking of the contrast, tone is encoded by a specific acoustic correlate, namely fundamental frequency (f_0). For accent systems, on the other hand, we have to make a further distinction between lexical pitch-accent systems, where the syntagmatic contrast in prominence is encoded by f_0, and lexical stress systems, where it is encoded by other prosodic parameters, such as duration, vowel quality and intensity-related parameters.[31]

The distinction between stress and pitch-accent is obscured by the fact that in stress languages, stressed syllables can carry a variety of f_0-patterns (rise, fall, rise-fall, etc), which encode pragmatic meanings. In other words, syllables are made prominent by f_0 in both stress languages and pitch-accent languages alike. The crucial difference is that whereas in a pitch-accent language the acoustic shape of the f_0-pattern of words is fixed at the lexical level, it is variable in a stress language. There the f_0-contour of the word is determined at the phrasal level, by intonational patterns with a pragmatic meaning (Ladd 1996).

In pitch-accent languages, it is also possible for words with a lexical accent to contrast with unaccented words. In Una, this contrast is limited to monosyllabic words – e.g. the minimal pair /ˈkal/ (with high f_0) 'tree species' vs. /kal/ (without high f_0) 'marsupial species' (Donohue 1997:367). Likewise, Japanese, a well-known pitch-accent language, features unaccented words that can be minimally contrastive with accented words, and here polysyllabic words too can be unaccented: e.g. /ˈkaki/ 'oyster' vs. /kaˈki/ 'fence' vs. /kaki/ 'persimmon' (McCawley 1978:114). However, even when we take into account the possibility of a contrast between unaccented and accented words, pitch-accent systems are distinct from tone systems. In the latter, the prosodic contrast is too complex to be analyzed in terms of (the presence/absence of) a syntagmatically variable prominence feature.

In summary, we distinguished three word prosodic features, on the basis of both phonological nature and phonetic encoding. Lexical tone stands out from both lexical pitch-accent and lexical stress because it is contrastive in a paradigmatic way, while the latter are syntagmatically contrastive, if at all. Lexical pitch-accent and lexical stress are phonologically identical, but differ in their encoding. That is, while pitch-accent is encoded by f_0, stress is realized by means of other acoustic parameters. Lexical tone and lexical pitch-accent are similar in the sense that both are encoded by means of f_0.

3.1.2. Hybrid word-prosodic systems

To what extent is it possible for languages to feature more than one of the word prosodic features distinguished in the previous section? That is, can a language

[31] Beckman (1986) refers to lexical stress and lexical pitch-accent as stress and non-stress accent, respectively.

feature lexical stress and also lexical pitch-accent, or both lexical tone and lexical stress, or the combination of lexical tone and lexical pitch-accent?

First, in order for two word prosodic features to be functional in a language simultaneously, their encodings must be distinct from one another. For this reason, the combination of lexical tone and lexical pitch-accent is unlikely: these features are encoded by the same prosodic parameter (f_0). Instead of languages with both tone and pitch-accent as independent factors, we find word-prosodic systems that seem hard to classify as either one of them, with a lexical tone contrast that is syntagmatically constrained (McCawley 1978, van der Hulst & Smith 1988, Donohue 1997).

This leaves the combinations of lexical stress with lexical tone, and that of lexical stress with lexical pitch-accent. A first issue is what we mean with a combination of word prosodic features. Stress and tone or pitch-accent can cooccur in a word prosodic system in a number of ways. These will be discussed below. Section III.1.2.1. deals with hybrid systems in which the position of lexical stress is predictable. Section III.1.2.2. discusses hybrid systems with phonemic lexical stress. The distinction between predictable and contrastive lexical stress is important for the discussion of the encoding of lexical stress in a hybrid system in § III.1.2.3.

3.1.2.1. Hybrid systems with predictable lexical stress

Languages like Swedish (Bruce 1977, Gussenhoven & Bruce 1999) and some Limburg dialects of Dutch (Gussenhoven & Bruce 1999) feature a lexical tone contrast that is limited to stressed syllables. Obviously, lexical tone and lexical stress are not independent factors in these languages: a syllable can only be marked with one of the lexical tones if it has lexical stress.

Combinations of tone and stress as independent factors, on the other hand, have been reported for numerous languages. In a survey of word prosodic features in African languages, Downing (to appear) discusses over twenty tone languages that are reported to feature stress on a fixed position in the word or stem. In seventeen Bantu tone languages (among others Swahili and Shona) stress is located invariably on the penultimate syllable of the word (Downing, to appear). In other languages, such as the Nilo-Saharan language Dholuo and the western dialects of Lingala, it is the initial syllable of the stem or of the word that is stressed. Outside Africa, Pike (1986) hypothesizes that the Athapaskan language Central Carrier features both pitch-accent and fixed penultimate stress. Finally, there is the phonetic study of Thai by Potisuk, Gandour & Harper (1996), who argue that this tone language has fixed final stress. We will come back to this study below.

Descriptions of languages reported to feature both stress and tone often do not discuss how stress is realized. And the studies that are explicit about it note that stress is most salient in phrase-final position (Downing, to appear). Discussing stress in African tone languages, Downing (to appear) writes that “the most commonly reported correlate […] is lengthening, with sources often noting that lengthening is most noticeable when words are in phrase-final position.” Lengthening of the stressed syllable is also reported as the acoustic realization of fixed stem-initial

stress in Dholuo (Tucker 1993 in Downing, to appear). If the acoustic encoding of stress is limited to phrase-final position in these languages, then they may be featuring phrasal stress rather than lexical stress.

This potential confusion between lexical and phrasal stress does not exist for a number of other languages, in which the position of lexical stress is not fixed, but instead depends on the phonological structure of the word. The Cushitic language Iraqw, for example, features a vowel length contrast, lexical pitch-accent, and also lexical stress (Mous 1993). Lexical stress is assigned in function of vowel length and pitch-accent. Lexical stress is associated with the penult if it has a long vowel, but if the penult vowel is short and the final syllable carries a high tone, then the final syllable is stressed. Finally, if none of these conditions is fulfilled, then the initial syllable is stressed. Similarly, in the Niger-Congo languages Kpelle and Noon, the position of lexical stress is predictable on the basis of tone structure and syllable structure, respectively (Downing to appear).

What all the hybrid systems discussed so far have in common is that lexical stress is predictable, either fixed on a certain prosodic position, or predictable on the basis of the phonological structure of the word. As will be argued below, this makes them unattractive to investigate the acoustic encoding of the word prosodic features.

3.1.2.2. Hybrid systems with phonemic stress

Before the current study, there was one language that had been reported to feature contrastive lexical stress in addition to lexical tone. This language is the Caribbean creole language Papiamentu, the result of a linguistic melting pot situation with West African and Iberian (Spanish, Portuguese) ingredients. While all previous publications have analyzed its tonal feature as lexical tone (Römer 1991, Kouwenberg & Murray 1994, Rivera-Castillo 1998, Kouwenberg ms.), it can be interpreted best as lexical pitch-accent. Papiamentu features hundreds of disyllabic minimal pairs distinguished by a Low-High vs. High-Low tone contrast, both with initial stress (Joubert 1991). Examples of these patterns are listed in Table III.2. Importantly, pattern Low-Low does not occur, and High-High only occurs in a small number of exceptions that are based on compounds (Kouwenberg, ms.). This means that the High tone is a culminative feature, which evidently is contrastive in a syntagmatic way. In polysyllabic words with more than two syllables, syllables to the left of the penultimate can have a high tone, but it is not contrastive.

The regular word prosodic pattern for disyllabic verbs infinitives is ˈL-H. These are distinguished from the corresponding participle forms by lexical stress, which is final in participles of disyllabic verbs (Kouwenberg, ms.). Table III.2 presents some examples of this phenomenon. In summary, there is compelling minimal-pair evidence that Papiamentu features both lexically contrastive pitch-accent and distinctive lexical stress.

Table III.2: Minimal set examples of tone and stress contrast in disyllabic words in Papiamentu. High tones – or, in my reinterpretation, lexical pitch-accents – are transcribed by a diacritic on the vowel. Based on Joubert (1991) and Kouwenberg (ms.).

ˈ**High-Low**	ˈ**Low-High**	**Low-**ˈ**High**
ˈmúla 'mule'	ˈmulá 'to grind (infinitive)'	muˈlá 'to grind (participle)'
ˈlíga 'union, bond'	ˈligá 'to bind (infinitive)'	liˈgá 'to bind (participle)'
ˈdébe 'debt'	ˈdebé 'to owe (infinitive)'	deˈbé 'to owe (participle)'

In this chapter, I argue that the Austronesian language Maˈya, which has been introduced in Chapter II, features a word-prosodic system with contrastive lexical stress in addition to an unambiguous lexical tone contrast. This hypothesis is supported by a phonological analysis of the Maˈya word prosodic system (§ III.2), and by a phonetic investigation into the acoustic properties of the hypothesized stress feature (§ III.3). Before presenting the Maˈya data, we will first discuss the issue of the phonetic encoding of lexical stress in a hybrid word prosodic system.

3.1.2.3. The phonetic encoding of lexical stress in a hybrid system

Various studies have investigated the realization of lexical stress in languages in which it is the only word prosodic feature, such as English (Fry 1955, Beckman 1986, Sluijter 1995) and Dutch (Sluijter 1995, Sluijter & van Heuven 1996). An important insight has been that in these languages, the lexically stressed syllable may carry an intonational pitch-accent with a pragmatic function, and that this optional pitch-accent should be distinguished from the encoding of lexical stress. The more recent studies (Beckman 1986, Sluijter 1995, Sluijter & van Heuven 1996) take this distinction into account, and have investigated the acoustic encoding of stress in words that are not carrying such focus-marking accents. Both for English and for Dutch, the more recent studies indicate that the lexically stressed syllable is acoustically distinct from unstressed syllables by a longer duration, a less centralized vowel quality, and a more level distribution of intensity over the spectrum. This last acoustic parameter is related to perceptual loudness (see § III.3.2.4).

Beckman (1986), Sluijter (1995), and Sluijter & van Heuven (1996) have investigated the realization in minimal pairs such as English /ˈpervert/ (noun) vs. /perˈvert/ (verb). The analysis of minimal stress pairs allows us to investigate the effect of the factor lexical stress while all other factors that can affect the acoustic parameters are kept constant. In this way, acoustic measures on the first syllable of

/'pervert/ (noun) are compared with the same measures made on the first syllable of /per'vert/ (verb). This explains why it is difficult to investigate the realization of lexical stress in a language where stress is assigned to syllables in a predictable way. In such a language, there are no minimal stress pairs, and stressed and unstressed syllables therefore always differ in syllable position, syllabic structure, or other factors that affect the acoustic correlates of lexical stress.

The same issue is relevant to the study of the acoustic realization of lexical stress in a hybrid word prosodic system. Here too, the study of the acoustic realization of lexical stress is obscured by the interference of other variables when stress is assigned predictably and the data used in the comparison are not minimal pairs distinguished solely by lexical stress. A case in point is the above-mentioned phonetic study on Thai by Potisuk, Gandour & Harper (1996), who argue that this tone language has lexical stress. The stress feature investigated by Potisuk et al. (1996) is marked only on word-final syllables, and, as a consequence, cannot be investigated in minimal word pairs. As an alternative, the authors analyzed minimal pairs, one of the members of which is a disyllabic compound noun, consisting of a noun root followed by a verb root. In such a compound, the final syllable carries stress. The authors compared the acoustic realization of the less prominent first syllable of such compounds with the same root in a noun-verb sequence, where both syllables carry stress as independent words. The authors find the single noun root word to feature a longer duration than the same noun root in the compound, and interpret this as marking of stress. But because one of the members of the minimal pair was followed by a word boundary, this durational marking can alternatively be explained in terms of word-final lengthening (of the one-root noun), and/or anticipatory shortening (of the noun in the compound).

A language with contrastive lexical stress, on the other hand, is ideal to investigate the acoustic realization of stress, in hybrid word prosodic systems just as it is in systems where lexical stress is the only word prosodic feature. No such study has previously been carried out in a hybrid word prosodic system. It would be worthwhile to find out whether the acoustic encoding of stress in a hybrid word prosodic system is the same as in a system where it is the only word prosodic feature.

Highly relevant to this question is the Functional Load Hypothesis. In a cross-linguistic experimental study, Berinstein (1979) reports that speakers of K'ekchi, a Mayan language featuring contrastive vowel length, do not use duration as a cue to word stress. This implies that when a prosodic parameter is used to encode contrasts elsewhere in the phonological system of a language, its importance as a stress cue may be reduced. This hypothesis, hereafter the Functional Load Hypothesis (FLH), is attractive as it predicts the acoustic encoding and perceptual importance of prosodic parameters as correlates of lexical stress. From the perspective of the FLH, the prosodic parameters (duration, f_0, vowel quality, intensity parameters) constitute a finite resource, which a language can invest in the encoding of a variety of prosodic contrasts. The distribution of prosodic parameters is determined by a constraint to minimize overlap between various prosodic parameters in the encoding

linguistic functions. The FLH is similar to the dispersion hypothesis for vowel systems (Liljencrants & Lindblom 1972): both hypotheses claim that languages will use the space available for variation – be it vowel formants or prosodic parameters – in order to maximize the contrast between linguistic categories.

It is clear that functional load plays an important factor in prosodic systems. Consider for example the case of f_0 in languages featuring lexical tone and in languages featuring lexical stress. As we saw above, in languages where lexical stress is the only word prosodic feature, it is marked by duration, vowel quality, and intensity. This leaves f_0 available to encode a wide range of pragmatic contrasts at the sentence-level (intonation) in such languages. In particular, focus-marking pitch-accents can be associated with lexically stressed syllables. In languages featuring lexical tone on the other hand, f_0 is spent on the encoding of lexical contrasts, and is not or only to a lesser extent available for the encoding of intonational contrasts. Indeed, descriptions of tone languages tend to have little to say about the intonational uses of f_0. In the tone language Mandarin Chinese, for example, focus is marked by executing the lexical tone patterns of focused constituents with greater f_0-excursion (Xu & Wang 1997). Similarly, in her study on intonation in the African tone language Yoruba, Laniran (1993) makes no mention of tonal features with a non-lexical function.

From the perspective of the FLH, a word prosodic system with both lexical stress and lexical tone is not problematic. Since in simple (i.e., non-hybrid) word prosodic systems lexical stress is encoded by duration, vowel quality, and intensity, and lexical tone by f_0, there is no overlap in encoding between these features. As a consequence, it should be possible for lexical stress and lexical tone to cooccur in a hybrid word prosodic system, with the same encoding they each have in a word prosodic system where they are the only word prosodic feature.

The FLH does predict, however, one important difference between the acoustic realization of stressed syllables in a hybrid as compared to a simple word prosodic system. As we saw above, in a simple word prosodic system with lexical stress, stressed syllables can carry focus-marking intonational f_0-peaks. In a simple word prosodic system with lexical tone, on the other hand, f_0 is primarily determined at the lexical level, and only to a lesser extent by intonation. From the perspective of the FLH, therefore, lexically stressed syllables should not carry intonational pitch-accents in a hybrid system with lexical stress and lexical tone. Because if they would, there would be overlap and potential loss of distinctiveness, with f_0 marking both the lexical tone contrast, and intonational contrasts on stressed syllables.

3.2. The phonology of Maˈya word prosody

3.2.1. Van der Leeden's analysis

Van der Leeden (1993) is a descriptive study of Maˈya phonology, based on the Salawati dialect as it is spoken in the village of Samate. The author distinguishes four tonemes, namely High /3/, Rising /^{12}/, Falling /^{21}/, and Low /^{1}/.[32] Examples on monosyllabic words are listed in Table III.3.

Table III.3: Examples of tonemes in monosyllabic words.

High	**Falling**	**Rising**	**Low (?)**
ˈsa^{3}	ˈsa^{21}	ˈsa^{12}	
'to climb'	'one'	'to sweep'	
ˈna^{3}	ˈna^{21}	ˈna^{12}	
'sugar palm'	'belly-3S'	'sky'	
ˈga^{3}	ˈga^{21}	ˈlo^{21}n	
'wood'	'cracked'	'ladder'	
ˈto^{3}l	ˈlo^{21}n	ˈto^{12}l	
'three'	'heart-3P'	'egg'	
		ˈde^{12}	ˈde^{1}
		'k.o. kinship rel.'	'still'
		ˈma^{12}t	ˈmat^{1}
		'to die'	'person'
	ˈbe^{21}		ˈbe^{1}
	'give'		'for'

Monosyllabic content words with a High, Rising, or Falling toneme are frequent, and there are many minimal sets between them. Van der Leeden's list of monosyllabic minimal pairs involving toneme Low (1993:66 – listed in Table III.3), on the other hand, is exhaustive, and each of these minimal pairs is debatable.[33] As

[32] Note on transcription. I use van der Leeden's transcription system for Maˈya word prosody. Tonemes are transcribed after the vowel on which they are realized by one or two digits. In this way, the language user's f_0-range is represented by the range from 1 (low) to 4 (extra high). A single digit implies the tone is level, a double digit implies it is a contour. Accent is marked by ˈ preceding the lexically accented syllable. Accent is also marked in monosyllables, since the two analyses differ in this respect.

[33] Two of these items do not constitute independent phonological words: /ˈde^{1}/ can only appear as an affix on a predicate, and /ˈbe^{1}/ is a prepositional affix. /ˈma^{1}t/ 'person' can be transcribed alternatively as /ˈma^{21}t/, without loss of lexical contrast.

van der Leeden (1993:66) himself admits, monosyllabic words offer little evidence for the distinction between Falling and Low tonemes.

Van der Leeden's (1993:66) main argument for the Low toneme comes from a contrast between two disyllabic tone patterns, illustrated by the minimal pair between /ma$^{21\text{ˈ}}$na^{3}/ 'light of weight' and /ma$^{1\text{ˈ}}$na^{3}/ 'grease'. Both of these patterns (/^{21}-$^{\text{ˈ}3}$/ and /^{1}-$^{\text{ˈ}3}$/) occur frequently, and in van der Leeden's analysis lexical contrast is maintained by the tonemes of the unstressed first syllables.

Most content word roots are either monosyllabic or disyllabic. The latter are marked by one out of a small set of prosodic patterns (i.e. combinations of tonemes and lexical stress), listed in Table III.4. In polysyllabic content roots with more than two syllables, the last two syllables have the patterns in Table III.4; all preceding syllables have the Low toneme.

Table III.4: Word prosodic patterns in disyllabic words.

Word prosodic pattern	**Examples**		
/^{1}-$^{\text{ˈ}12}$/	ga$^{1\text{ˈ}}$na^{12}n 'small'	ta$^{1\text{ˈ}}$me^{12}p 'to spill out'	ka$^{1\text{ˈ}}$te^{12}m 'one'
/^{1}-$^{\text{ˈ}21}$/	ka$^{1\text{ˈ}}$wa^{21}t 'root'	ka$^{1\text{ˈ}}$lu^{21}n 'feather'	sa$^{1\text{ˈ}}$gu^{21}l 'nose-3sg'
/^{1}-$^{\text{ˈ}3}$/	ma$^{1\text{ˈ}}$na^{3} 'grease'	ta$^{1\text{ˈ}}$la^{3} 'k.o. plant'	ma$^{1\text{ˈ}}$ya^{3} 'the Ma$^{\text{ˈ}}$ya'
/^{21}-$^{\text{ˈ}3}$/	ma$^{21\text{ˈ}}$na^{3} 'light of weight'	ta$^{21\text{ˈ}}$la^{3} 'banana'	wi$^{21\text{ˈ}}$ni^{3}m 'to drink'

The regularly attested disyllabic word patterns are /^{1}-$^{\text{ˈ}12}$/, /^{1}-$^{\text{ˈ}21}$/, /^{1}-$^{\text{ˈ}3}$/ and /^{21}-$^{\text{ˈ}3}$/. We see that, in each pattern, at least one syllable has a non-Low tone. Apart from /^{21}-$^{\text{ˈ}3}$/, the distribution of non-Low tonemes is limited to the final syllable of the root. Stress appears to be a redundant feature: in non-derived content words, it is invariably marked on the final syllable of the root, which also carries a non-Low toneme.

Both the High and the Rising tonemes can be replaced by the Falling toneme (see Table III.5). This occurs in a number of lexical, morphological and syntactic processes. The nature of these processes varies widely: e.g. compound noun formation (III.5a), noun phrase formation (II.5b), and comparative formation (III.5e)). Van der Leeden (1993, 1997) analyzes this phenomenon as morphological tone. In other words, toneme /^{21}/, apart from being a lexical tone, can function as a suprafix, and the meanings encoded by this morpheme are collectively labeled as 'permanent relation' (van der Leeden 1993:79).

In all but one of the mono- and disyllabic patterns in Table III.5, stressed High and Rising tonemes are replaced by the Falling toneme. This replacement process actually decreases lexical distinctiveness by reducing lexical contrast, because both /^{21}/ and /^{1}-$^{\text{ˈ}21}$/ also occur in non-derived roots. The only exception to this replacement

process is pattern /^{21}-$^{\text{ˈ}3}$/ – already anomalous, as we saw above, because it has a non-Low tone on the penultimate syllable. For this disyllabic pattern, the replacement process has a different outcome, the only case of its kind (see Table III.5e). Specifically, content words with the word prosodic pattern /^{21}-$^{\text{ˈ}3}$/ (with lexical stress on the root-final syllable) have /$^{\text{ˈ}21}$-^{1}/, with stress on the penult, as a result of the tone replacement process.

In summary, content words tend to have lexical stress on the final syllable of the root. Penultimate stress only occurs when pattern /^{21}-$^{\text{ˈ}3}$/ becomes /$^{\text{ˈ}21}$-^{1}/, in an exception to the tone replacement process. The addition of suffixes to bare content word roots does not trigger a shift in the location of lexical stress. This implies that lexical stress is part of the lexical root, and that it is not assigned in relation to the edge of the prosodic word domain.

Table III.5: The effect of morphological tone replacement on word prosodic patterns. Examples (a) to (d) were taken from van der Leeden (1993:80).

	Morphological tone replacement	**Word before tone replacement**	**Example – word form under tone replacement**
(a)	/$^{\text{ˈ}12}$/ -> /$^{\text{ˈ}21}$/	ˈga^{12} 'place'	ˈla^{12}p ˈga^{21}o fire place 'fireplace'
(b)	/$^{\text{ˈ}3}$/ -> /$^{\text{ˈ}21}$/	ˈso^{3}p 'to bathe'	ˈso^{21}p ka^{1}lwa^{21}ˈna^{3}t bathe naked 'to bathe nakedly'
(c)	/^{1}-$^{\text{ˈ}12}$/ -> /^{1}-$^{\text{ˈ}21}$/	ma$^{1\text{ˈ}}$le^{12} 'evening'	ma$^{1\text{ˈ}}$le^{21} fa^{1}na^{1} evening DEM 'yesterday evening'
(d)	/^{1}-$^{\text{ˈ}3}$/ -> /^{1}-$^{\text{ˈ}21}$/	wa$^{1\text{ˈ}}$gu^{3}l 'to shave'	ni^{1}-k ˈsye^{12}n te^{1} ya^{1}-ˈgu^{21}lo POS-P1S knife RL 1S-shave 'the knife with which I shave'
(e)	/^{21}-$^{\text{ˈ}3}$/ -> /$^{\text{ˈ}21}$-^{1}/	ma$^{21\text{ˈ}}$na^{3} 'light of weight'	ˈma^{21}na^{1} ˈnye^{3}t light_of_weight CMP 'lighter of weight'

In function words, on the other hand, lexical stress is variable (van der Leeden 1993:57-59 – see examples in III.1). Function words do not feature variation in tonal patterns: in van der Leeden (1993), syllables of function words are marked with the Low toneme.

(3.1)	ˈe^{1}ne^{1}	ˈki^{1}sa^{1}	ˈgi^{1}ma^{1}na^{1}
	PRS1S	almost	DEM

3.2.2. An alternative analysis

Van der Leeden's analysis of Ma'ya word prosody, outlined above, has some features that are functional only in distinguishing one specific word prosodic pattern. In the tonal system, there is little evidence for the Low toneme /^{1}/: there is not one unquestionable minimal pair involving the Low toneme in monosyllabic words. Van der Leeden's crucial argument for the Low toneme comes from the existence of disyllabic pattern /^{21}-$^{\iota 3}$/, where toneme /^{21}/ on the first syllable apparently contrasts with the /^{1}/ in the first syllable of pattern /^{1}-$^{\iota 3}$/ (see examples in Table III.4). This pattern /^{21}-$^{\iota 3}$/ is exceptional in three ways.

First, it is the only non-derived pattern with a toneme other than /^{1}/ in the penultimate syllable. If it were not for /^{21}-$^{\iota 3}$/, we could limit paradigmatic tonal contrast to the final syllable of the root, rather than assuming that every syllable of each word is marked for tone. Second, under the process of tone replacement process illustrated in Table III.5, the final High /^{3}/ is replaced by toneme /^{1}/ rather than by toneme /^{21}/, as is the case for the final-syllable tonemes in all other patterns. This makes it the only word-prosodic pattern for content words with the Low toneme in the final syllable of the root. Third, the result of this process is the only pattern for content roots involving stress on the penultimate. Everywhere else, stress in content words is marked on the final syllable of the root in van der Leeden's analysis.

Clearly, van der Leeden's treatment of pattern /^{21}-$^{\iota 3}$/ – and its derived form /$^{\iota 21}$-^{1}/ – has determined his analysis considerably: if it were not for this pattern, Ma'ya can be analyzed as a three-tone language, with tonal contrast limited to the final syllable of content roots. I will now demonstrate that such a less complex analysis is indeed possible, and show that the pattern that van der Leeden analyzes as /^{21}-$^{\iota 3}$/ can be accounted for in more insightful way. An interesting starting point for this alternative analysis is van der Leeden's comment on the contrast between /^{1}-$^{\iota 3}$/ and /^{21}-$^{\iota 3}$/:

> /^{1}-$^{\iota 3}$/ and /^{21}-$^{\iota 3}$/ are the most suspicious of all toneme patterns. It took a long time before I became aware of, and was able to hear, the difference between them. Forms with the latter pattern differ from those with the first pattern because their initial syllable vowel becomes lengthened by the down-glide, which also lowers the pitch of toneme /^{3}/ of their final syllable. [van der Leeden 1993:71]

Apparently, duration is a major factor distinguishing the first syllables of pattern /^{1}-$^{\iota 3}$/ and pattern /^{21}-$^{\iota 3}$/ from one another. This difference in perceived duration cannot be interpreted as an indication of lexically contrastive vowel length, however, since there is no independent support for a vowel length contrast elsewhere in Ma'ya phonology. In particular, there is no minimal pair evidence for a vowel length contrast in monosyllabic content words.

Instead, this perceived length could be an indication of stress. In § III.1.2.3, I have argued on the basis of the FLH that it is unlikely for a syllable carrying lexical stress in a hybrid word prosodic system which also features lexical tone to be

marked by an intonational pitch-accent, because this would be precluded by the presence of lexical tone. Consequently, we would expect duration to stand out most clearly as an stress cue, unaccompanied by intonational f_0. Therefore, I hypothesize that the contrast between /^{1}-ˈ^{3}/ and /^{21}-ˈ^{3}/ is in fact a contrast in stress location – i.e., /n-ˈ^{3}/ vs. /ˈn-^{3}/.[34]

This hypothesis is supported by a reinterpretation of what van der Leeden analyzed as morphological tone replacement. In van der Leeden's analysis, this process involves a replacement of tonemes /^{12}/ and /^{3}/ by toneme /^{21}/, with a morphological function. This analysis has a number of weak points. First, if /^{21}/ is a tonal morpheme, it has a number of very different functions. Inspection of the examples in Table III.5 reveals that the debatable tonal morpheme encodes comparative formation of adjectives (5e); compounding of nouns (5a), verbs (5b) and adverbs (5c), and instrumental marking on verbs (5d). These and other meanings are proposed in van der Leeden (1993, 1997). Second, we would expect a tonal morpheme to distinguish all words within a class; instead two tonemes are merged with a third, existing lexical toneme. Third, there is the exception for the pattern van der Leeden's analyzes as /^{21}-ˈ^{3}/: for this pattern, van der Leeden's analysis postulates stress shift to the first syllable, and an irregular tone change: /^{21}-ˈ^{3}/ becomes /ˈ^{21}-^{1}/.

Under the reanalysis proposed above, van der Leeden's /ˈ^{21}-^{3}/ is reanalyzed as /ˈn-^{3}/. There is thus no need for a rule that shifts stress to the first syllable, because stress is penultimate in the first place. In the reanalysis, the final syllable simply loses its toneme: /ˈn-^{3}/ becomes /ˈn-n/. Importantly, this tone loss scenario is sufficient to account for all the phonological changes that van der Leeden attributed to morphological tone replacement. Both analyses of the phenomenon are contrasted in Table III.6. In the alternative analysis, van der Leeden's toneme /^{21}/ is reinterpreted as stress. Lexical stress remains when tonemes /^{3}/ and /^{12}/ are lost. This implies that stress functions both paradigmatically and syntagmatically. On the one hand, it stands in paradigmatic contrast to tonemes /^{12}/ and /^{3}/, both in monosyllabic and in polysyllabic words. Also, it is the default paradigmatic element to which the /^{12}/ and /^{3}/ tonemes are reduced under tone loss. On the other hand, it functions as syntagmatically contrastive prominence in mininal pairs such as /ˈmana^{3}/ 'light of weight' vs. /maˈna^{3}/ 'grease'. In fact, the presence of tone loss in Maˈya does not come as a surprise: lexical tone is already limited to one syllable per content root, and is absent in function words. The tone loss phenomenon further restricts tones in higher constituents, such as compounds and phrases. The output of this phenomenon appears to be determined by a constraint that no more than one lexical toneme remains within a some phrase-level prosodic domains.

[34] In this alternative analysis, tone is only contrastive on the final syllable. Therefore, non-final syllables are not marked for tone. For example, the minimal pair that van der Leeden transcribed as /ma^{21}ˈna^{3}/ vs. /ma^{1}ˈna^{3}/ becomes /ˈmana^{3}/ vs. /maˈna^{3}/, respectively. In general discussions of tonal patterns, syllables not marked for tone are transcribed 'n'.

Table III.6: Overview of word prosodic patterns, according to van der Leeden (1993) analysis and according to the reanalysis proposed here. Prosodic patterns are illustrated by examples. For each prosodic pattern it is specified how it changes under the influence of what van der Leeden analyzes as morphological tone replacement and what is reanalyzed here as tone loss.

Analysis by van der Leeden (1993)			**Reanalysis proposed here**		
Example	**Prosodic patterns**	**Morph. tone replacement**	**Example**	**Prosodic patterns**	**Tone loss**
ˈsa^{12} ‘to sweep’	ˌ^{12}	ˌ^{21}	ˈsa^{12} ‘to sweep’	ˌ^{12}	ˈn
ˈsa^{3} ‘to climb’	ˌ^{3}	ˌ^{21}	ˈsa^{3} ‘to climb’	ˌ^{3}	ˈn
ˈsa^{21} ‘one’	ˌ^{21}	ˌ^{21}	ˈsa ‘one’	ˈn	ˈn
ˈde^{1} ‘still’	ˌ^{1}	not reported	de ‘still’	n	n
ga^{1}ˈna^{12}n ‘small’	^{1}-ˌ^{12}	^{1}-ˌ^{21}	gaˈna^{12}n ‘small’	n-ˌ^{12}	n-ˈn
ma^{1}ˈna^{3} ‘grease’	^{1}-ˌ^{3}	^{1}-ˌ^{21}	maˈna^{3} ‘grease’	n-ˌ^{3}	n-ˈn
ka^{1}ˈwa^{21}t ‘root’	^{1}-ˌ^{21}	^{1}-ˌ^{21}	kaˈwat ‘root’	n-ˈn	n-ˈn
ma^{21}ˈna^{3} ‘light’	^{21}-ˌ^{3}	ˌ^{21}-^{1}	ˈmana^{3} ‘light’	ˈn-^{3}	ˈn-n

In summary, the prosodic phonology of Maˈya becomes less complex under the above reanalysis, which crucially depends on exploiting lexically contrastive stress.

- The morphological tone proposed by van der Leeden was shown to be vulnerable both because of its representation and because of its unclear meaning. It was reanalyzed as a matter of domain- or phrase sensitive tone loss. In contrast to van der Leeden’s analysis, this tone loss process is without exception: in all cases, the toneme in the final syllable of the root is lost (see Table III.6).
- The distinction between van der Leeden’s /^{1}-ˌ^{3}/ and /^{21}-ˌ^{3}/ patterns is reanalyzed as a difference in stress (so /n-ˌ^{3}/ vs. /ˈn-^{3}/). As a consequence, we no longer need to postulate the Low toneme /^{1}/. Syllables with van der Leeden’s Low toneme are unstressed and toneless in the reanalysis.

- Van der Leeden's Fall toneme (/^{21}/) can be reinterpreted as stress without tonemes /^{12}/ or /^{3}/, so /ˈn/. Stress functions as the unmarked paradigmatic tonal element, in lexical contrast with tonemes /^{12}/ and /^{3}/. So, in agreement with the evidence from monosyllabic minimal sets, Maˈya has three paradigmatically contrastive tones. One of these, stress, is the default, to which the other two are reduced under tone loss.
- In van der Leeden's analysis every syllable of every word is marked for tone. Under the reanalysis, paradigmatic tonal contrast is limited to the final syllable of the root of content words. Pattern /^{21}-ˈ^{3}/ – reanalyzed as /ˈn-^{3}/ – was the only exception to this rule.

3.2.3. Conclusion

The reanalysis proposed above can be summarized as follows. Maˈya features three paradigmatically contrastive tones. To begin with, there are the High and the Rising tonemes (/^{3}/ and /^{12}/ respectively). The distribution of these tonemes is limited to the final syllable of content word roots. Paradoxically, lexical stress functions as a third paradigmatically contrastive element, in contrast with the High and Rise tonemes. The following analysis in terms of phonological features illustrates how stress can be the unmarked toneme. A word like /ˈban/ 'to seek shelter' is distinct from /ˈba^{12}n/ 'k.o. tree', because /ˈban/ has [+ stress], while /ˈba^{12}n/ has [+ stress] and [+Rise toneme].[35] Under tone loss, the High and the Rise tonemes are lost leaving stress. Evidently, this implies to a loss of lexical contrast. Lexical stress is syntagmatically contrastive in polysyllabic words, either on the penultimate or on the final syllable.

As compared with van der Leeden (1993), this reanalysis requires two tonemes less, is more constrained with respect to the domain of lexical tone, is less redundant regarding stress, involves no stress shift rule, and does not postulate morphological tone. Consequently, the reanalysis is less complex: it analyzes the same data with fewer[36] phonological primitives and postulates less tone marking in the lexicon. In the next section we will look at the phonetic support for the reanalysis.

[35] Alternatively, the tonemes can be analyzed in terms of L(ow) and H(igh) tonal targets. Then the rising contour tone is represented phonologically as /LH/, and the level high toneme as /H/.

[36] Variable stress is also part of van der Leeden's analysis – see examples in III.1 and in Table III.5e.

3.3. A phonetic account of lexical stress in Maˈya

3.3.1. Introduction

According to the reanalysis of Maˈya word prosodic phonology presented above, Maˈya features lexically contrastive stress. If this is true, then the prosodic contrast in minimal pairs such as /ˈmana^3/ 'light of weight' vs. /maˈna^3/ 'grease' is marked by acoustic parameters such as duration, intensity and vowel quality. The hypothesis predicts that f_0, on the other hand, does not mark the stressed syllables, because Maˈya's lexical tone feature precludes intonational f_0-marking. A first piece of support for these predictions comes from van der Leeden's statement – quoted above – that the first syllable of /ˈmana^3/ sounds longer than the corresponding syllable in /maˈna^3/. Van der Leeden accounted for this difference by assuming that the longer syllable is marked by a falling contour tone, which would take more time to realize. However, the reanalysis proposed above additionally predicts that the stressed second syllable of /maˈna^3/ will be longer relative to the corresponding unstressed syllable in /ˈmana^3/. In van der Leeden's analysis, on the other hand, these syllables are word-prosodically identical (both stressed and with a High toneme), and as a consequence, his analysis predicts that there is no difference in duration. Clearly, the duration of the second syllable is an important criterion to evaluate which hypothesis is the better one. Additional support can come from other prosodic parameters. In well-studied stress systems such as English (Beckman 1986, Sluijter 1995) and Dutch (Sluijter & van Heuven 1996), vowel quality and selective intensity are important correlates of stress, in combination with duration. Therefore, if duration, vowel quality and selective intensity single out the first syllable in words like /ˈmana^3/ and the second syllable in words like /maˈna^3/, this supports the hypothesis that this lexical contrast is one of stress. Section III.3.3 reports the results of an acoustic analysis of potential stress correlates in minimal pairs. Before that the data collection and analysis procedures are presented.

3.3.2. Data collection and analysis[37]

3.3.2.1. Speakers

Recordings were made with eight native speakers of Maˈya (5 male, 3 female). All speakers had spent most of their lives in the village of Samate on Salawati – the village where van der Leeden collected most of the data for his analysis of Maˈya phonology. They were between 20 and 70 years old, and all used Maˈya daily. The informants were paid a fee.

[37] I collected these data during two fieldwork trips to the village of Samate on Salawati, in April, 1999, and in February, 2000.

3.3.2.2. Elicitation procedure

The lexical items on which this analysis is based were recorded as part of a larger wordlist, with members of a minimal pair at least fifteen minutes apart. The procedure for each item was as follows. All interaction between the researcher and the native speaker took place in Indonesian. The native speaker was presented with an Indonesian lexical item, and was asked to utter its Maˈya translation out loud. If necessary, they received more information about the meaning or the usage of the word in Maˈya. If a speaker was unable to guess the Maˈya word on the basis of this information, or offered a semantically related alternative, the researcher wrote the Maˈya word on paper. From the speaker's reaction it was clear whether he/she knew the word or not. If the speaker did not know the word, no further attempts were made to elicit it. The response, a lexical item in Maˈya, was recorded in three contexts – see example (III.2): (a) in isolation; (b) embedded sentence-finally in a carrier sentence; (c) embedded sentence-medially in a carrier sentence. One to three repetitions were recorded for each context.

(3.2)
Researcher [in Indonesian]:
telur
egg

Informant [in Maˈya]:

(a)	ˈto^{12}l				[citation form]
	egg				
(b)	ˈsia	ˈbas	ˈto^{12}l		[sentence-final in carrier sentence]
	PRS3P	say	egg		
	They say egg.				
(c)	ˈsia	ˈbas	ˈto^{12}l	saˈpo^{12}	[sentence-medial in carrier sentence]
	PRS3P	say	egg	NEG	
	They do not say egg.				

Because the context frames were the same throughout the recording sessions, the target words stood out as new information within the utterance they appeared in. The interaction with each informant lasted approximately one hour, interrupted by two short breaks between the blocks.

The recordings were made using a Sony WM-D6C tape recorder (featuring user-controlled input level and a constant-speed mechanism) and a Shure SM10A directional close-talking microphone (head mounted). All utterances were digitized, at a sampling frequency of 22,050 kHz.

3.3.2.3. Materials used in the analysis

This analysis is based on six lexical items, which make up the three minimal stress pairs in Table III.7. This approach allows for a paradigmatic analysis of lexical stress. For example, we compare the acoustic parameters of the (arguably stressed) first syllable of /ˈmana^{3}/ with the same parameters of the (arguably unstressed) first syllable of /maˈna^{3}/. Both members of each of the minimal pairs have the High toneme on the final syllable. In all three minimal pairs, both syllables have the vowel /a/ in nucleus.

Only the realizations in sentence-medial context were analyzed, in order to avoid phrase-final effects on the acoustic parameters. The target words are preceded by a low target and followed by a syllable unspecified for tone.

Table III.7: The minimal stress pair stimuli, by stress location.

Penult. stress /ˈ**n-**^{3}/	**Final stress** /**n-**ˈ^{3}/
ˈtala^{3}	taˈla^{3}
'banana'	'k.o. plant'
ˈkaya^{3}	kaˈya^{3}
'rich' (loan word)	'machete'
ˈmana^{3}	maˈna^{3}
'light (of weight)'	'grease'

3.3.2.4. Data analysis

Two hundred sixteen tokens (i.e., vowels) were analyzed (8 speakers * 3 minimal pairs * 1 to 3 repetitions[38] * 2 target syllables [penultimate/final]). After manual segmentation of the target words, all further measurements were made automatically using the procedures available in the speech analysis package Praat (Boersma & Weenink 1996). The following measurements were made of each of the vowels in the target words.

- Duration. Duration is the acoustic cause of perceived length. On the basis of the segmentation, I collected the duration of each of the vowels of the target words (A in Figure III.1), expressed in milliseconds (ms).
- Fundamental frequency (f_0). F_0 is the acoustic cause of perceived pitch, and therefore the acoustic correlate of tonal features. F_0 is determined by the rate of vibration of the vocal folds. Acoustically, it can be defined as the simple wave with the lowest frequency in the waveform of a sound. In this study, f_0 was measured by means of the accurate autocorrelation algorithm of Boersma (1993), which is implemented in Praat. The f_0 tracks produced by this algorithm were checked and where necessary hand-corrected for octave jumps and other

[38] One to three repetitions were initially recorded for each item. Whenever possible, all repetitions were analyzed. Realizations of poor quality (e.g. because of a hesitation, background noise, etc.) were not included.

tracking errors. Data points were collected for f_0 mean and f_0 standard deviation, both over the vowel (A in Figure III.1). The data points were expressed in Hertz (Hz) and in terms of the psychoacoustic ERB-scale. Whereas the Hertz value of a f_0 measurement is a direct reflection of the frequency of the component wave with the lowest frequency, the ERB-scale produces a derived measure, designed to take into acount the characteristics of human perception. Human perception of frequency is logarithmic rather than linear. For example, the difference between 100 and 200 Hertz is perceived as considerably greater than that between 1000 and 1100 Hertz. By converting values on the physical (Hertz) frequency scale to a psycho-acoustic scale, this characteristic of human perception can be taken into account, and the differences between values become realistic in perceptual terms. The Equivalent Rectangular Bandwidth (ERB) (Hermes and van Gestel 1991) is such a psycho-acoustic frequency scale. Hertz values can be converted to ERB values and vice versa by means of the following formulas (from Greenwood 1961):

$$[\text{ERB\_value}] = 16.7 \log_{10} (1 + [\text{Hz\_value}] / 165.4)$$
$$[\text{Hz\_value}] = 165.4 (10^{0.06\,[\text{ERB\_value}]} - 1)$$

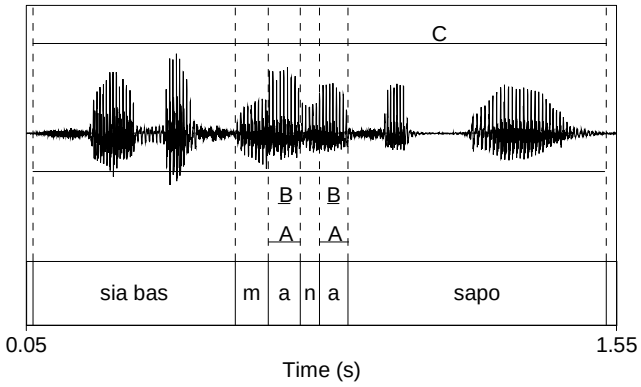

Figure III.1: Waveform of sentence with target word /ˈmana[3]/. The graph shows the segmentation (on label tier), the domains of the vowels of the target word (A), the 32-ms domains around the midpoints of the vowels (B), and the domain of the whole utterance (C), which serves as an intensity reference in the computation of rlB3.*

- Vowel quality is the acoustic cause of the perceived difference between vowels. The most important factors that determine vowel quality are the first and second formants (F_1 and F_2, respectively). Both F_1 and F_2 are the result of resonance in the vocal tract during articulation. The F_1 value of a vowel determines its perceived height, and depends on the degree of constriction in the throat cavity. The greater the constriction in the throat cavity during the articulation of a vowel, the higher its F_1 value, and the lower its vowel height. For example, the high vowel [i] has a low F_1-value, and the low vowel [a] has the highest F_1

value of all vowels. Similarly, F_2 is related to the frontness (or backness) of a vowel, and depends on the position of the tongue in the mouth cavity. As the tongue is positioned more forward in the mouth during the articulation of a vowel, its F_2 is higher. For example, the vowel [e] has a high F_2 and the vowel [o] has a low F_2. The mean values for F_1 and F_2 of each vowel were measured over a 32-ms window centered symmetrically on the temporal midpoint of the vowel (B in Figure III.1). By limiting the domain over which the mean formant values are calculated, the effect of surrounding consonants on the measurement is reduced. Measurements for F_1 and F_2 were collected automatically with the Split Levinson algorithm that is implemented in Praat. Just as for f_0, the vowel quality measures were expressed both in the physical Hertz scale and in a psycho-acoustic scale (Bark), which takes into account the characteristics of human perception. Whereas the ERB scale is commonly used to scale f_0 measurements are scaled in terms of human perception by means of the ERB scale, the same is done for formant measurements by means of the Bark scale.

- Intensity is the acoustic cause of perceived loudness. Research on lexical stress (Sluijter 1995, Sluijter & van Heuven 1996) has shown that the loudness perceived in stress prominence is related to the proportion of high-frequency energy in the sound, rather than to its overall intensity. The intensity measure used here is based on that conclusion: it selectively takes into account high-frequency intensity rather than overall intensity. First, the spectrum of energy distribution was computed over the same 32-ms window used for the formant measures (B in Figure III.1). Mean intensity, expressed in decibel (dB), was measured over this 32-ms domain in the frequency band of 1,000 to 1,750 Hz. This range, hereafter B3, proved to be most sensitive to variation in intensity in function of stress in Sluijter & van Heuven (1996). B3 includes F_2. The B3 measure was normalized for variation in vowel quality between stress conditions for each syllable separately. This was done with the formula of Fant (1960, in Sluijter & van Heuven 1996), leading to the derived measure B3*. Because recording sensitivity varied throughout data elicitation, the intensity measure B3* was divided by the mean intensity (dB) of the whole utterance (C in Figure III.1), resulting in a normalized rlB3*. In summary, rlB3* is a measure of the intensity in the frequency band between 1,000 and 1,750 HZ, normalized for variation in vowel quality and for variation in recording sensitivity.

3.3.2.5. Statistical analysis

The descriptive statistics are presented in figures in § III.3.3, and in tables in Appendix A. They are based on raw measures, and so are the inferential statistics for duration and selective intensity (rlB3*). The inferential statistics for f_0 and formants, expressed in ERB and Hertz respectively, were standardized per speaker in order to normalize for between-speaker variation in acoustic register and range.

Repeated measures style analyses of variance (RM-ANOVA) (Loftus & Loftus 1988) were carried out with fixed or independent factors stress (stressed/unstressed)

and syllable (penultimate/final), and random factor speaker. As a criterion to determine significance, alpha was set at the value of 0.01.

Analysis of variance (ANOVA) is a statistical test to determine whether various groups differ from one another in a significant way. In the standard (between-subject) ANOVA, it is assumed that each measurement constitutes an independent case. Evidently, this condition is not fulfilled in the current analysis, since various repetitions of each of the target words are included. Instead of the between-subject ANOVA, therefore, we need to use the 'repeated-measures' ANOVA. In this variant of the ANOVA test, the effect of the independent variable on the dependent variable is significant to the extent that it is found consistently across subjects, and to the extent that the factor subject is random. Accordingly, whereas the degrees of freedom are determined on the basis of the number of cases in the between-subject ANOVA, they reflect the number of subjects in a repeated-measures design, because here the tokens do not constitute independent measurements. Because the repeated measures design was used, all ANOVA results reported below are over speakers, rather than over items.

The RM-ANOVAs will answer the question whether there is a significant difference in duration, vowel quality, selective intensity and f_0 in function of the hypothesized stress contrast. Beyond that, however, the RM-ANOVA results do not allow us determine how reliable these measures are at marking the distinction between stressed and unstressed syllables. Also, they do not provide an indication of the relative importance of these measures in the encoding of lexical stress. Both of these questions are highly relevant to this investigation. In particular, information on the relative importance of prosodic parameters may be used to evaluate whether the contrast under investigation is one of stress or, alternatively, of tone.

The best way to answer these questions is by investigating the relative importance of the above-mentioned measures in the perception of stress by language users. An alternative approach is to use a statistical test to infer to what extent the acoustic measures distinguish between stressed and unstressed syllables. In other words, such a statistical test reveals whether or not each of the measures would be of use to the language user in the perception of lexical stress. This can be done by means of Linear Discriminant Analysis (LDA). The LDA procedure generates a discriminant function, which is based on the linear combination of the independent variables that provides the best discrimination between the groups. In this study, the groups are stressed and unstressed syllables, and the independent variables on which the discriminant function is based are the four above-mentioned acoustic measures. These measures are used as postdictors in the LDA, since their importance as stress correlates is evaluated in the same data set that was used to determine the weighing of these measures in the discriminant function.

LDA is more powerful than the ANOVA: whereas ANOVA merely requires a certain degree of consistent variation between stress categories, the LDA will reveal whether this variation is large and consistent enough for syllables to be classified successfully as stress or unstressed. If one or more of the above measures is a stress correlate, it should be a reliable postdictor of stress irrespective syllable position. To

see if this is the case, the LDA analyses were carried out not only over all syllables, but also by syllable position (penultimate/final).

3.3.3. Results and discussion

3.3.3.1. Duration

The statistics for duration are represented in Figure III.2. As this figure illustrates, there are two additive effects. First, stressed syllables are longer than unstressed syllables [$F(1,7) = 189.5$; $p<0.01$]. Importantly, this is also true for the final syllable, where the two competing hypotheses make markedly different predictions. Second, final syllables are significantly longer than penultimate syllables [$F(1,7) = 23.27$; $p<0.01$]. This difference between penultimate and final syllables – 33 ms on average – is considerably smaller than between stressed and unstressed syllables – 72 ms on average. To some extent, the effect of syllable position may be due to anticipatory shortening of the penultimate syllable or to a lengthening of final syllables. Finally, there is a significant interaction between stress and syllable [$F(1,7) = 13.54$ $p<0.01$], because the difference in duration between the final and the penultimate syllable is greater for stressed than for unstressed syllables.

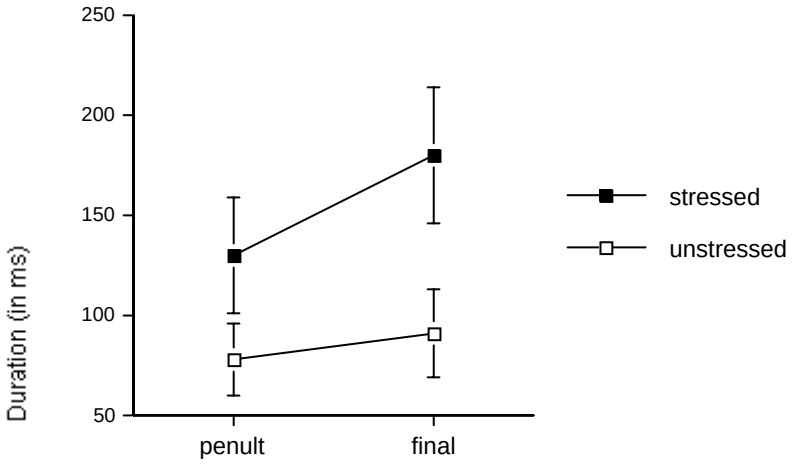

Figure III.2: Means and standard deviations for duration, by syllable and stress, over speakers and items.

The Linear Discriminant Analysis (LDA) confirms that duration is a reliable cue in the perception of stress: 88.9 percent of the syllables can be classified correctly as stressed or unstressed on the basis of their raw duration only. Separate analyses for penultimate and final syllable give correct stress classification results of 87 and 93.5 percent respectively. This means that duration is a reliable stress cue irrespective of syllable position.

3.3.3.2. Vowel quality

Ma'ya features a five vowel system (/i,u,e,o,a/) with no schwa. All three minimal pairs have the vowel /a/ in both syllables. Centralization of the vowel /a/ in unstressed syllables would affect the first formant (F_1), which reflects vowel height, but not the second (F_2), which reflects the front-back dimension and does not distinguish /a/ from central schwa. Consequently, if the contrast in the minimal pairs in Table III.7 is one of stress, we predict an effect of stress on F_1, but not on F_2. This is indeed the case: F_1 is significantly lower (i.e. more centralized) for unstressed than for stressed vowels [$F(1,7) = 62.26$; $p<0.01$] – see also Figure III.3. The effect of syllable on F_1 is not significant [$F(1,7) < 1$; n.s.], and neither is the interaction between stress and syllable [$F(1,7) = 3.98$; n.s.]. As expected, stress has no significant effect on F_2 [$F(1,7) < 1$; n.s.]. Neither does syllable [$F(1,7) < 1$; n.s.], nor the interaction between syllable and stress [$F(1,7) < 1$; n.s.].

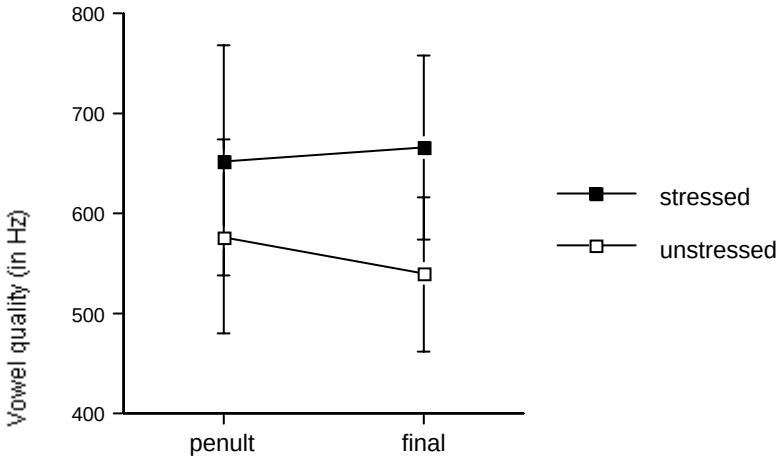

Figure III.3: Means and standard deviations for the first formant (F_1), by syllable and stress, over speakers and items.

The LDA results for correct stress classification on the basis of F_1 are 80.6 (both syllables), 77.8 (penultimate syllable) and 84.3 (final syllable). In summary, stressed and unstressed syllables can be successfully distinguished on the basis of F_1, irrespective of syllable position.

3.3.3.3. Selective intensity

RlB3* is a corrected measure of mean intensity in the frequency band between 1,000 and 1,750 Hz (see § III.3.2.4). Figure III.4 shows that rlB3* is higher in stressed syllables than in unstressed syllables. This effect is significant [$F(1,7) = 18.5$; $p<0.01$]. RlB3* does not vary significantly in function of the factor syllable [$F(1,7) < 1$; n.s.], and the interaction between syllable and stress also is not significant [$F(1,7) = 8.18$; n.s.].

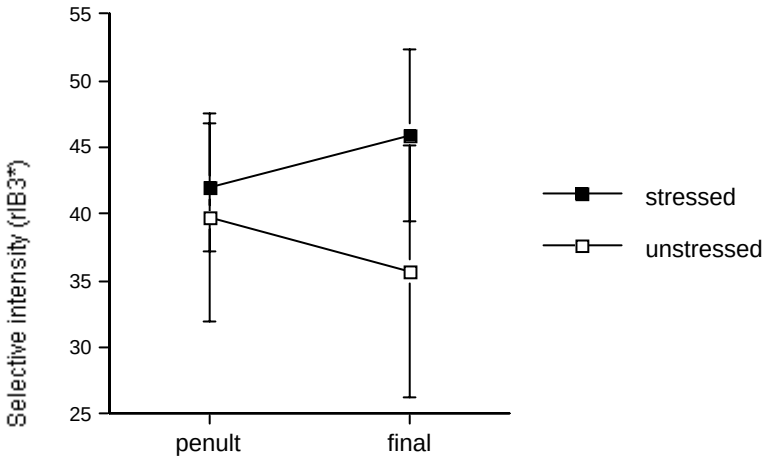

Figure III.4: Means and standard deviations for the selective intensity measure rlB3, by syllable and stress, over speakers and items.*

The above results indicate that rlB3* varies systematically between stressed and unstressed syllables. The almost significant effect of the interaction between stress and syllable reflects that rlB3* distinguishes stressed from unstressed syllables more clearly in final syllables.

Over all syllables, the LDA correct classification result is 67.6. With 61.1 percent correct classification, the LDA result for the penultimate syllable is considerably lower than for the final syllable (74.1 percent). We can conclude that some effect of stress on selective intensity is present in both syllable positions, but the size of the effect is not the same.

3.3.3.4. Fundamental frequency (f_0)

Figure III.5 shows that stressed syllables on average are higher than unstressed syllables in word-final position, but lower in the penultimate syllable. Because of this inconsistency, the effect of stress on f_0 is not significant [$F(1,7) = 9.28$; n.s.].

Considerably larger and more consistent is the mean difference between penultimate and final syllables (16 Hz on average). This is to be expected, as the

final syllable is marked with the High tone in both members of the minimal pairs. This effect is significant [$F(1,7) = 708.05$; $p<0.01$]. Also, there is a significant interaction between stress and syllable [$F(1,7) = 14.624$; $p<0.01$]: the final syllable, marked with the High toneme, is relatively higher when stressed.

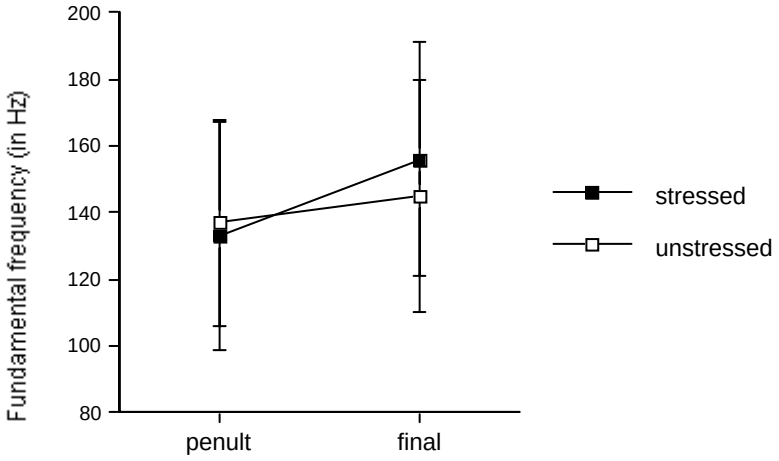

Figure III.5: Means and standard deviations for mean f_0, by syllable and stress, over speakers and items.

The LDA correct classification result for stress is 55.6 percent. Per syllable the LDA result is very variable. Of penultimate syllables, 65.7 percent were correctly classified for stress. The result for the final syllable (78.7 percent) reflects the large difference between stressed and unstressed final syllables. The overall LDA result is lower than the by-syllable results because the relation of f_0 between unstressed and stressed vowels is not consistent over syllables (see Figure III.5), and this hinders overall correct classification.

We can conclude that f_0 mean is not a reliable correlate of lexical stress. As we will see below, f_0 does play a significant role elsewhere in the word prosodic system of Ma'ya: in the encoding of the lexical tone contrast.

3.3.3.5. Interpretation of the results

The results can be summarized as follows. The effect of stress (stressed vs. unstressed) and syllable position (penultimate vs. final) was investigated for four acoustic parameters: duration, vowel quality, selective intensity and f_0. While duration, vowel quality and selective intensity values varied significantly in function of stress, f_0 did not. Effect size in RM-ANOVA was greatest for duration, followed by vowel quality and selective intensity. This variation in effect size between acoustic parameters is faithfully reflected in the LDA successful discrimination scores observed for the acoustic parameters. Figure III.6 shows that successful

discrimination was highest for duration, followed by vowel quality, selective intensity and f_0, in that order. Syllable position, on the other hand, was found to have an unmistakable effect on f_0. Syllable position also had a much smaller effect on duration.

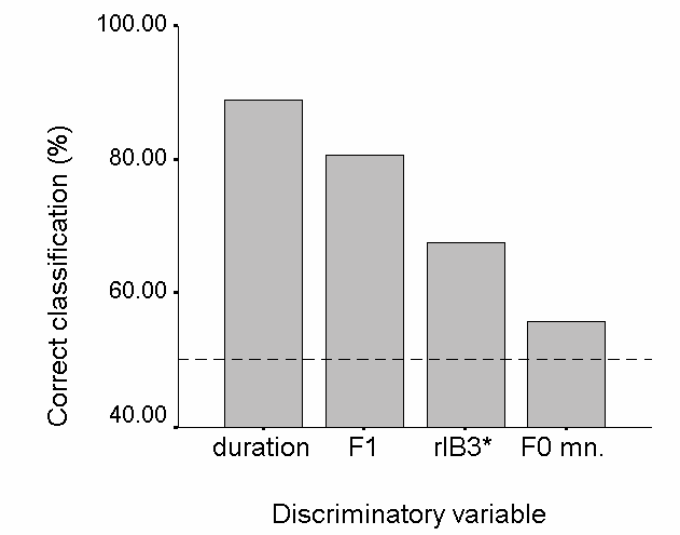

Figure III.6: Percentage correct stress discrimination in LDA for each of the acoustic parameters (over syllables). The 50 percent chance level baseline is represented as a dashed line.

According to the hypothesis argued for here, the lexical contrast between the words in the first and second column of Table III.7 is one of stress. Stress is hypothesized to be penultimate in /ˈmana^3/ 'light of weight' (pattern /ˈn-^{3}/), but final in /maˈna^3/ 'grease' (pattern /n-^{ˈ3}/). This hypothesis is supported by the results of the acoustic investigation. Prosodic parameters set apart the first syllable of pattern /ˈn-^{3}/ and the second syllable of pattern /n-^{ˈ3}/ from the second syllable in /ˈn-^{3}/ and the first syllable in /n-^{ˈ3}/. In other words, this is a syntagmatic contrast: the stressed syllable is distinguished from the unstressed syllable in the word. Also, the acoustic parameters marking this syntagmatic contrast are well-known stress correlates: duration, vowel quality and selective intensity. The relative importance of these parameters as correlates of stress is similar to their relative importance in well-researched stress languages such as English (Beckman 1986, Sluijter 1995) and Dutch (Sluijter 1995, Sluijter & van Heuven 1996). The effect of stress on f_0 is inconsistent. For the penultimate syllable, there is hardly any difference in mean f_0 in function of stress, but if any at all it is in the wrong direction. In final position, on the other hand, stressed syllables are considerably higher than unstressed syllables. This situation is in agreement with the stress hypothesis. For the penultimate syllable, the absence of a difference in f_0 in function of stress follows from the fact

that lexical tone precludes focus-marking on stressed syllables by means of f_0. In tone languages, focus can be marked intonationally by realizing the lexical tone patterns with a greater range (see e.g. Xu & Wang 1997 on Chinese). This is what we find for the final syllable, which features a High tone, when it is stressed.

The contrast analyzed here as one of stress – /ˈn-^{3}/ vs. /n-ˈ^{3}/ –, was analyzed by van der Leeden (1993) as a tone contrast: /^{21}-ˈ^{3}/ vs. /^{1}-ˈ^{3}/. In van der Leeden's analysis, stress is on the final syllable in both words, and lexical contrast is maintained by lexical tone. Because the first syllable of pattern /^{21}-ˈ^{3}/ carries a contour tone and the first syllable of pattern /^{1}-ˈ^{3}/ does not, his hypothesis can account for the difference in duration between the first syllables of members of the minimal pairs. However, it cannot explain the same-size difference in duration between the final syllables of the two patterns, because these syllables have the same phonological features in his analysis (stress and toneme /^{3}/). In summary, van der Leeden's analysis cannot account for the syntagmatic nature of the difference in syllable duration between the two word prosodic patterns. The same is true for the effect of vowel quality and selective intensity. Van der Leeden's analysis cannot account for the differences in vowel quality and selective intensity between the first syllable of /^{21}-ˈ^{3}/ and the first syllable of /^{1}-ˈ^{3}/, and ditto for the difference between second syllable of /^{21}-ˈ^{3}/ and the second syllable /^{1}-ˈ^{3}/. As for f_0, the /^{21}-ˈ^{3}/ vs. /^{1}-ˈ^{3}/ analysis predicts that the first syllable with tone /^{21}/ is higher than the first syllable with tone /^{1}/. This is not the case.

3.3.3.6. Comparing stress correlates with tone correlates

We can further support the alternative analysis by demonstrating that the prosodic parameters that encode the stress contrast do not distinguish between the three paradigmatically contrastive tones (High, Rise and default/stress/Fall). Measurements were made on eight monosyllabic three-way pseudo-minimal sets. The nucleus vowel is always /a/, just as in the minimal stress pairs. Since these words are monosyllables, they can only vary paradigmatically, i.e., in terms of lexical tone.

The target words were embedded sentence-medially in the same context sentence as the stress items. Data were elicited from eight native speakers.[39] Whenever possible two, but otherwise one, repetition(s) of each word were analyzed, using the analysis procedure of the above stress analysis. The total number of cases is 381. The only difference in the data analysis procedure has to do with the normalization of the selective intensity measure.[40] The descriptive statistics are presented in Table

[39] Four male, four female. Four of these speakers (three male, one female) were part of the group of speakers for the minimal pairs for accent.

[40] The calculation of selective intensity (rlB3) is slightly different from the way it was calculated for the accent minimal pairs. The normalization for the effect of the shift of formants in function of accent (formula of Fant 1960, in Sluijter and van Heuven 1996) was not carried out, because we are dealing with a three-way rather than a two-way distinction. This is not problematic, though, because the formant values are only marginally different in function of tonemes (see F_1 values in Table III.8).

III.8. Figure III.7 shows the LDA results for correct toneme classification on the basis of the four acoustic measures under investigation.

Table III.8: Means (mn.) and standard deviations (s.d.) for duration (in milliseconds), F_1 (in Hz), selective intensity (rlB3), and mean f_0 (in Hz), by the factor toneme.*

Toneme	Duration		F_1		Sel. intensity		Mean f_0	
	mn.	s.d.	mn.	s.d.	mn.	s.d.	mn.	s.d.
High	155	35	704	81	53.7	6.1	179	45
Falling	143	35	682	96	49.4	6.8	160	39
Rising	157	34	693	102	48.0	6.4	154	37
All tonemes	152	35	693	93	50.4	6.9	165	42

Duration and vowel quality (F_1) do not really distinguish between the three tones. With correct classification results of 36.7 and 38.6 respectively, they hardly raise discrimination above the 33 percent chance-level baseline. For selective intensity, the correct tone classification result is better – at 45.9 percent. The explanation for this well-above chance result may be that, to some extent, selective intensity is correlated with mean f_0. Table III.8 shows that as a tone's mean f_0 is higher, so is the selective intensity value. The highest correct classification result is found for mean f_0 (67.2 percent). This value may still seem low, for a tone language. The reason is that the Falling (= stress) and the Rising tones are similar in terms of this f_0 parameter. An LDA of mean f_0 in combination with a parameter reflecting f_0 slope gives 81.6 percent correct classification.

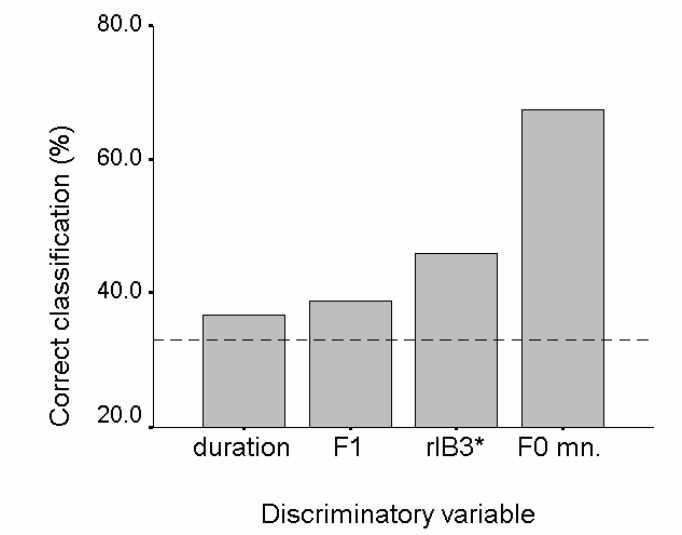

Figure III.7: Percentage correct tone discrimination in LDA for each of the acoustic parameters. The 33 percent chance level baseline is represented as a dashed line.

When we compare the LDA results for tone discrimination in Figure III.7 with the corresponding results for stress discrimination in Figure III.6, we find that the relative importance of acoustic parameters is the opposite. That is, the acoustic parameters most important in the encoding of stress are least important in the encoding of tone, and vice versa. This supports the hypothesis that Ma'ya features stress, because it demonstrates that the acoustic encoding of the hypothesized stress contrast differs markedly from the encoding of the Ma'ya tone contrast.

3.4. Conclusion

There is compelling evidence that the language Ma'ya features both lexically contrastive stress and lexical tone, as independent factors in its word-prosodic system. Ma'ya has been reported to be a tone language by van der Leeden (1993). Its tonal system was reanalyzed in this chapter as a three-way lexical tone contrast, limited to the final syllable of content roots.

The objective of this chapter was to present evidence in support of the hypothesis that, in addition to and independent of the lexical tone feature, Ma'ya features lexically contrastive stress, a hitherto unknown combination of word-prosodic features. First, a phonological analysis of the word prosodic system revealed that, by postulating contrastive stress, a number of phenomena can be described in simpler terms. Second, an acoustic analysis of disyllabic minimal pairs showed that the contrast under investigation is of a syntagmatic nature, and that it is encoded by the

configuration of prosodic parameters stress tends to be encoded by (Beckman 1986, Sluijter 1995, Sluijter & van Heuven 1996).

The Ma'ya word prosodic system is exceptional, with both contrastive lexical stress and lexical tone. In § III.1.2.2, I noted that together with Papiamentu, Ma'ya is the only language for which such a hybrid word prosodic system with contrastive lexical stress has been reported. While it is possible that more of such systems await discovery, we can safely conclude that this combination of word prosodic features is rare. The question is why. As predicted by the FLH and illustrated by the Ma'ya evidence, the acoustic encoding of a word prosodic system with both contrastive lexical stress and lexical tone is not problematic. In Chapter VI we will examine historical and comparative data that shed light on the question of how this unusual word prosodic system developed. This will result in a tentative answer to the question why hybrid word prosodic systems with contrastive lexical stress are rare.

4 Dialectal variation in the lexical tone system of Maˈya[41]

4.1. Introduction

4.1.1. In general

Maˈya was introduced in Chapter II as the Austronesian language of the sea-oriented villages in the Raja Ampat archipelago. These villages are found on the three big islands of the Raja Ampat archipelago: Misool, Salawati and Waigeo (see Figure II.4). While Misool and Salawati each feature a single dialect, dialectal variation is stronger on Waigeo, where three dialects can be distinguished: Laganyan, Wauyai and Kawe (see Chapter II).

The description of Maˈya phonology by van der Leeden (1983, 1993) revealed that Maˈya features lexical tone. Lexical tone is atypical and highly uncommon among Austronesian languages. Out of 1,236 Austronesian languages (Grimes 1996), only fifteen[42] (1.2 percent) have been reported to use tone to mark lexical contrasts. As a consequence, it may well be that Maˈya developed this feature under the influence of a neighboring non-Austronesian tone language. The neighboring Papuan languages of the New Guinea mainland exhibit a wide range of tonal phenomena (Donohue 1997), and there is evidence that the Austronesian and Papuan languages have influenced one another extensively in the region where Maˈya is used (Reesink 1998).

The survey reported in Chapter II showed that only three of the five Maˈya dialects feature lexically contrastive tone. These dialects are the variants of Misool and Salawati, and the Laganyan dialect of Waigeo. The aim of this chapter is to

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[41] This chapter has been submitted for publication to Language and Speech as B. Remijsen 'Dialectal variation in the lexical tone system of Maˈya'. A preliminary version has been presented in a P-workshop presentation at the Department of Theoretical and Applied Linguistics of the University of Edinburgh (March 2001), and at the *Journées de tonologie* tonology symposium (Toulouse, June 28-30, 2001).

[42] Five languages of New Caledonia (Rivierre 1993), the Chamic languages Eastern Cham (Edmondson & Gregerson 1993) and Utsat (Maddieson & Pang 1993), Mor (Laycock 1978), the North Huon Gulf languages Yabem and Bukawa (Ross 1993), Kara, Barok and Patpatar (Hajek 1995), all three in New Ireland, and in the Raja Ampat archipelago the languages Maˈya (Van der Leeden 1983, 1993), and Matbat (see Chapter V).

investigate the variation between the lexical tone systems of these three dialects. Such a study is worthwhile, because it offers a window on diachronic change in a tone system. Divergence between the tone systems of dialects of the same language is likely to be limited, so that it is possible to trace the changes that have taken place since the dialect split, and the processes behind them.

4.1.2. The tonemes of Ma'ya

Van der Leeden (1993) distinguished the following four tonemes in Ma'ya: Low, Rise, Fall, and High. He transcribes these tonemes as /^{1}/, /^{12}/, /^{21}/ and /^{3}/, respectively. In Chapter III I have argued that the Low toneme (/^{1}/) does not exist, because there is no convincing minimal pair evidence. Following the reanalysis proposed there, Ma'ya has three tonemes: two contour tones (Rise /^{12}/ and Fall /^{21}/) and a level tone (High /^{3}/). According to van der Leeden (1993), the perceived tonal patterns of the contour tones are similar to one another in average pitch, but opposite in slope, one rising, and the other falling. The third toneme is level and high, and its prototypical perceived pitch level lies above that of the other two tonemes. The paradigmatic contrast between these three tonemes is evident from a large number of minimal pairs and triplets, a number of which are listed in Tables 5, 6, and 7 of Appendix E.

The Fall plays a pivotal role in the word prosodic system of Ma'ya, because it is involved in both the lexical stress and the lexical tone contrasts. On the one hand, the Fall can be interpreted as lexical stress without High or Rise toneme (see § III.2.2), and therefore it will be transcribed as lexical stress. On the other hand, however, the Fall is a toneme in the sense that it contrasts with the Rise and the High in minimal sets. The Fall also stands out from the other two tonemes in that words carrying the Fall get an epenthetic final vowel /o/ when they occur sentence-finally.

Van der Leeden's (1993) interpretation of Ma'ya as a lexical tone system has been challenged by Donohue (1997:371). In a review article on tonal systems in New Guinea, Donohue lists Ma'ya as a pitch-accent system, which he defines as a language in which "there is one simply designated syllable that determines the shape of the pitch pattern on the rest of the word" (Donohue, 1997:374). If Ma'ya is a pitch-accent language, it can only feature a binary contrast in monosyllabic words: words with versus words without pitch-accent. The pitch-accent analysis cannot, however, accommodate a three-way tonal contrast in monosyllabic words (see § III.1.1).

4.1.3. Summary and research objectives

Ma'ya has three lexically contrastive tonemes. In polysyllabic words the three-way tone contrast is limited to the final syllable. Additionally, Ma'ya polysyllabic words feature a lexical stress contrast that is independent of the tone contrast, with stress associated with either the penultimate or the final syllable.

This three-way tone contrast is present in only three of the five Ma'ya dialects: Misool, Salawati, and Laganyan. The boundaries between these three dialects are well defined, since each is used on a different island. The dialects of Ma'ya have necessarily developed from a stage that preceded dialectal divergence in the not so remote past, and therefore their tone systems are likely to be similar. A between-dialect comparison can reveal how the tone system of each dialect has diverged from the other two. In this way, we can gain insight in processes by which lexical tone systems change over time.

The main objective of this investigation, therefore, is to examine how the Salawati, Misool and Laganyan dialects of Ma'ya differ in the realization of their three tonemes, and to try to explain how these changes have come into existence. Second, an acoustic analysis of the tonal system of Ma'ya can corroborate the hypothesis that Ma'ya is a lexical tone language. This hypothesis, first presented by van der Leeden (1983, 1993), was challenged by Donohue (1997).

The chapter is structured as follows. Section IV.2 deals with the methodological approach. Then follow acoustic analyses of the three Ma'ya dialects that feature lexical tone (§ IV.3). The general discussion in § IV.4 presents the main findings of the investigation.

4.2. Data collection and analysis

4.2.1. Speakers

For each of the three dialects of Ma'ya that feature lexical tone (Salawati, Misool, and Laganyan), recordings were made with native speakers who lived in villages that are predominantly Ma'ya speaking.[43] For each dialect, eight adult speakers (4 male, 4 female)[44] were recorded. The speakers had spent most of their lives in their village, and they used their dialect of Ma'ya daily. All of them spoke Indonesian as a second language. The informants were paid a fee for their participation.

4.2.2. Materials and procedure

I will first describe the materials and procedure used for data collection of the Salawati dialect. Differences with the materials and data collection procedures for the other two dialects will be discussed at the end of this section.

The items to be recorded consisted of 14 pseudo-minimal triplets, for a total of 42 monosyllabic words. Each set was made up of either three words distinguished from

[43] Speakers of the Salawati, Misool and Laganyan dialect lived in the villages Samate, Fafanlap and Lupintol, respectively.

[44] For the Laganyan dialect, the data of one of the male speakers were not analyzed, because the utterances were not pronounced fluently.

one another solely by the three tonemes, or, alternatively, of three segmentally matched words distinguished by the three tonemes. In the latter case, the three members of the minimal set did not share all segmental phonemes, but segments not shared arguably have the same effect on f_0. For example, in the pseudo-minimal set /ˈgal/ 'mouth' vs. /ˈba^{12}m/ 'k.o. tree' vs. /ˈda^{3}l/ 'to crow', the onset consonants are all voiced stops, and the coda consonants voiced nasals or liquids.[45] The lexical items, most of them selected from van der Leeden (ms. 1), are listed in Table 5 of Appendix E. The members of each three-way minimal set were distributed over three blocks semi-randomly, ensuring that the members of each triplet were in different blocks. The list of items to be recorded was checked with a native speaker.

The elicitation procedure is identical to the one described in § III.3.2.2. When one member of a minimal set had not been recorded because a speaker did not know the word, the realizations of other members of that minimal set by that speaker were not included in the subsequent analysis.

There is one important difference between the analysis of Maˈya stress pairs described in Chapter III and the analysis reported here. Whereas for the stress analysis only the target words in sentence-medial position were analyzed, in the current analysis both sentence-medial and sentence-final contexts were taken into consideration – so both (a) and (b) in example III.2. In many languages, the final syllable of a word located at the end of an intonational phrase has a relatively longer duration (Vaissière 1983, Maddieson 1997). This phenomenon may well be a linguistic universal. In order to determine whether the tones of Maˈya are affected by such context-conditioned differences in the realization of word prosodic patterns, the acoustic realization of tones is investigated in two sentence contexts, both in the middle and at the end of the sentence.

For the Salawati dialect, 1,016 tokens were analyzed (2-4 realizations[46] [1-2 sentence-medial + 1-2 sentence-final] * 3 tonemes (High/Rise/Fall) * 14 pseudo-minimal triplets * 8 speakers).

The same method was applied to data collection for the Misool dialect. The context sentence in which the target words were recorded was the same as in the Salawati dialect, and the only difference has to do with the lexical items in the pseudo-minimal sets. Some words on the Salawati Maˈya stimulus list were not used in the Misool dialect, or differ in phonological form. Alternative members were collected for the affected pseudo-minimal triplets. The list of pseudo-minimal triplets is included in Table 6 of Appendix E. In total, 995 tokens were analyzed for the Misool dialect.

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[45] There are two exceptions. In the minimal pseudo-set /ˈlu^{3}/ vs. /ˈlu^{12}/ vs. /ˈsu^{21}/ (all three dialects) voiceless /s/ contrasts with voiced /l/. Likewise, there is a mismatch in voicing in the onsets of the pseudo-minimal sets /ˈfu^{3}n/ vs. /ˈfu^{12}n/ vs. /ˈwu^{21}n/ (Salawati dialect) and /ˈfu^{3}l/ vs. /ˈfu^{12}n/ vs. /ˈwu^{21}n/ (Misool dialect).

[46] Whenever possible, two realizations were analyzed for each sentence context. Only when one of the realizations was of poor quality (e.g. because of a hesitation), it was not included.

Laganyan is less similar to Salawati Maˈya than is Misool Maˈya. A number of the minimal sets of Salawati Maˈya do not occur in Laganyan, mostly because the phonological form of the word is different, and sometimes because the lexical item was unknown. As a consequence, the number of (pseudo-)minimal sets is smaller (8 sets – see Table 7 of Appendix E). Also, the context utterance was slightly different, because in many lexical items a /s/ in the Salawati and Misool dialects corresponds to a /h/ in Laganyan (see § II.3.1.2.3). As a consequence of this difference between the dialects, the context utterances were /ˈhia ba [target-word]/, and /ˈhia ˈba [target-word] ˈpo/ – both with the same meaning as in the other dialects. Of importance for the between-dialect comparison is that the negative marker of the Laganyan dialect – /haˈpo/, corresponding to Misool and Salawati /saˈpo[12]/ – is commonly reduced to /ˈpo/. This affects the tonal context of the target word. While it is followed by a toneless syllable in the Salawati and Misool dialects, it is followed by a Fall in the Laganyan dialect. The implications of this difference will be discussed below. Altogether 592 tokens were analyzed for the Laganyan dialect.

4.2.3. Data analysis and statistics

After manual segmentation of the target words, all further measurements were made automatically on the basis of the accurate autocorrelation algorithm of Boersma (1993), which is implemented in the speech analysis package Praat (Boersma & Weenink 1996). The following measurements – all in terms of the psychoacoustic ERB-scale[47] – were made of the vowel in the monosyllabic target words. These f_0-measurements were checked and where necessary hand-corrected for octave jumps and other tracking errors.

- F_0 mean of the vowel. Mean f_0 was computed over the domain marked for the vowel during segmentation. When voicing began slightly after vowel onset, the domain of measurement began at the first voiced ten-millisecond frame. The same procedure was applied, mutatis mutandis, when voicing ended before the end of the syllable.
- F_0 slope – a measure of the slope of the f_0-track. F_0 slope is computed by measuring mean f_0 from the beginning of the vowel to its temporal mid-point, and from the mid-point up to the end of the vowel. The value for the second half is subtracted from the value for the first half. This slope measure has a value that is higher than 0 if f_0 falls throughout the syllable, and lower than 0 if f_0 rises throughout the syllable. The f_0 slope value is close to 0 if f_0 is level, or if the domain measurement shows an equal-size mirrored change in f_0 in both halves of the vowel.
- F_0 at the vowel onset of the syllable following the target word. This measure is only calculated for the sentence-medial condition.

[47] The ERB-scale is introduced in § III.3.2.4, and its use is motivated there.

Means and standard deviations of these measures were calculated as descriptive statistics. They are listed in Tables 8 and 9 of Appendix E). Using the independent factors mean f_0 and f_0 slope, repeated measures analyses of variance (RM-ANOVA) were carried out with fixed factors tone (High/Fall/Rise) and sentence-context (medial/final), and a random factor of speaker.[48] The variable lexical item was not taken into account, because target words were matched by pseudo-minimal set. Post-hoc Scheffé tests were carried out to find out whether individual tonemes were significantly distinct from one another.

For the inferential statistics, all measures were standardized (z-transformed) per speaker to normalize for between-speaker variation in acoustic register and range. As a conservative measure, the alpha significance level was set to 0.01.

4.3. Results and discussion

4.3.1. Salawati dialect

4.3.1.1. High toneme (High)

In his analysis of the tonemes of the Salawati dialect, van der Leeden analyzes this toneme as level and high, well above the other two tonemes. The latter feature is confirmed by the descriptive statistics for mean f_0 (see Figure IV.1A): on average, it is .55 ERB higher than the other two tonemes are (Appendix E, Table 8).

As for its slope, Figures IV.1A suggest that it is a rising rather than a level high tone, which could be transcribed more faithfully as /^{23}/ rather than as /^{3}/. However, the initial rise is caused by the low target that precedes it in the frame utterance – the end target of the Fall on /^{l}bas/. This initial rise is absent when the High is preceded by a high tonal target. This is illustrated in Figure IV.2, which shows the f_0-track of such a tonal sequence in spontaneous speech. We can conclude that the initial rise of the High toneme in Figure IV.1A,B,C is due to context, and that in itself the High is level.

4.3.1.2. Rising toneme (Rise)

Van der Leeden labeled this toneme /^{12}/, a rise in the lower part of the tonal space. Figure IV.1B shows that, in sentence-final context, the Rise falls to the bottom of the tonal space right after vowel onset. After reaching this low, f_0 starts rising, reaching the middle of the tonal space by vowel offset. In sentence-medial context, on the other hand, the range of this rise is much more limited, as f_0 remains low throughout the vowel. While low f_0 during the middle part of the vowel is a constant feature of this toneme, the Rise can be realized without rising f_0 in the vowel domain.

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[48] Repeated-measures ANOVA is introduced in § III.3.2.5.

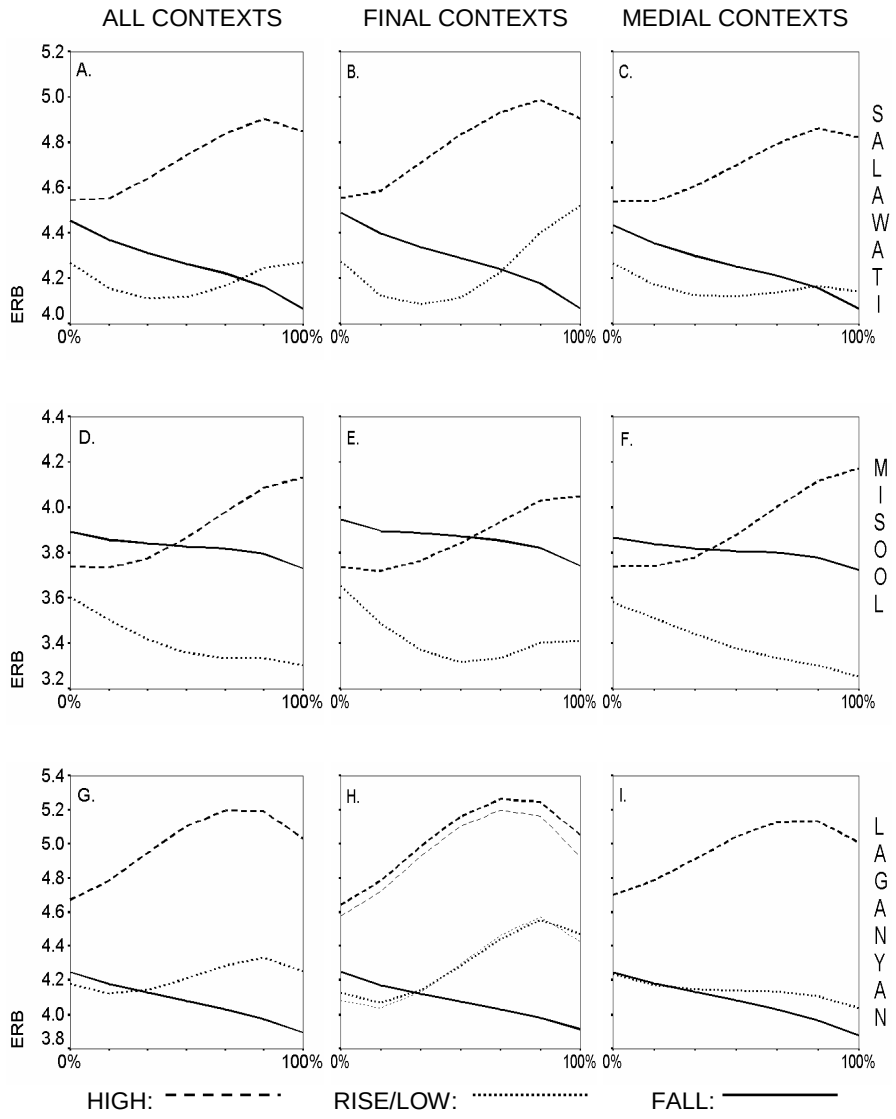
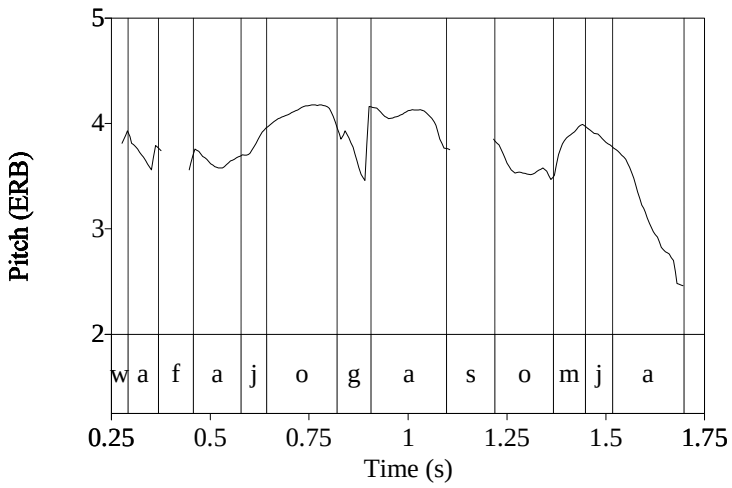


Figure IV.1: F_0 tracks of the three tonemes as realized on the vowels of monosyllabic words on a normalized time axis plotted along an ERB-scale. Fall tonemes in solid, High tonemes in dashed, and Rise or Low tonemes in dotted line. Separate figures by dialect and by sentence-context. Based on all data (see above). Note on figure IV.1H: the thick lines are the same as for the other contexts and dialects; the thin lines represent Rise and High tones on vowels with either no or an unvoiced coda.

The between-context variation in the realization of the Rise is evident from Table 9 of Appendix E, which presents the descriptive statistics for f_0 slope. Only for the Rise do we find a considerable difference as a function of context. The contour of this toneme is approximately level in sentence-medial condition (f_0 slope: 0.019 ERB on average), but in the sentence-final condition it is considerably higher in the second half of the vowel (f_0 slope: -.194 ERB on average).

However, this account in which the analysis is limited to the vowel oversimplifies the situation. It suggests the Rise toneme is low-then-rising in sentence-final context and mostly low sentence-medially. Instead, the rising part of the contour can be located after the end of the vowel, on a voiced coda consonant, or on a following toneless syllable.



Transcription: wa-fa'yo3 'ga3 'so12m-ya
3PL-decorate tree holy-FOCUS
They decorate the holy tree.

Figure IV.2: F_0 track and transcription of an utterance from the narrative in Appendix D.

First, when the syllable on which the rise is marked has a voiced coda (/l/, /m/, or /n/ in Ma'ya), the rise continues in the coda. This feature, which is also relevant to the other tonemes, is illustrated in Figure IV.3 for the sentence-final context: closed syllables with voiced codas have the same trajectories as syllables that have no or an unvoiced coda. That is, the domain with which tonemes are associated is not limited to the syllable nucleus, but extends to the whole voiced part of the rhyme, encompassing the coda consonant when it is voiced. This phenomenon is also

evident in the spontaneous speech example in Figure IV.2: the high end target of the Rise on /'so[12]mya/ is realized on the /m/.

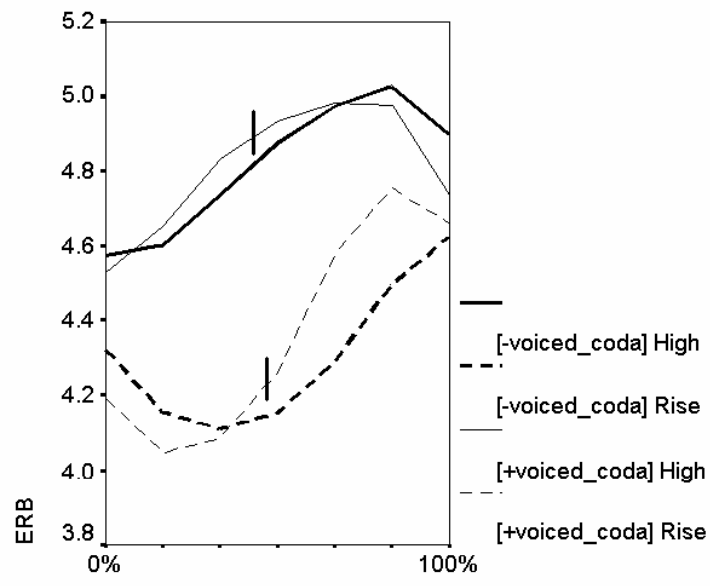


Figure IV.3: F_0 tracks of the High and Rise tonemes on syllables with and without voiced codas, in sentence-final context (Salawati dialect). The trajectories are represented on a normalized time axis (7-step) plotted along an ERB-scale. The vertical lines crossing the trajectories in the [+voiced coda] condition represent the averaged location of vowel offset. Based on 6 [+voiced coda], and 9 [closed or -voiced coda] pseudo-minimal pairs (12 and 18 items, respectively), by 8 speakers.

Secondly, irrespective of the presence of a voiced coda, the high final target of the Rise can shift to a following toneless syllable, and the Rise can be saliently marked by this high target on the following syllable. In the data set, the monosyllabic target word is in sentence-medial position followed by negative marker /sa'po[12]/. The first syllable of this word does not carry a lexical tone. F_0 on this toneless syllable, now, is determined by the toneme on the preceding syllable: for example, f_0 at vowel onset is on average .48 ERB higher when the preceding syllable is a High toneme than when it is a Falling toneme (see Fig. IV.4A). When the preceding syllable carried the Rise toneme, f_0 at vowel onset of the first syllable in /sa'po[12]/ is just as high as when is preceded by a High toneme (see Fig. IV.4A). Evidently, the final high target of the Rise toneme is realized on the following toneless syllable.

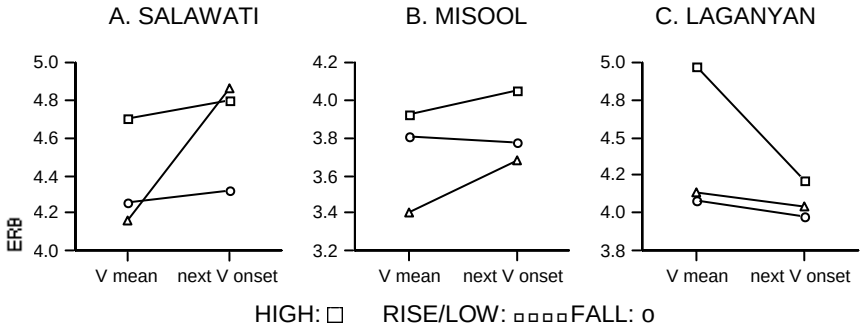


Figure IV.4: F_0 mean of the vowel of the target word in sentence-medial context and f_0-value at the onset of the following syllable for each of the three tonemes. Separate graphs for each of the dialects. High tonemes are marked by squares, Rise tonemes by triangles, Fall tonemes by circles. Based on Appendix E Table 6.

No data are available that could show whether the high end target of the Rise could have shifted rightward if the following syllable had carried a toneme. Data of the Laganyan dialect, where the target word is followed by a syllable carrying the Fall toneme, suggest that the onset of the following syllable would not have been available as a docking site for end targets (see Fig. IV.4C). Presumably, the distinction between the Rise and the Fall tonemes of the Salawati dialect would have been limited to the difference on the target word itself: the Rise falling sharply at vowel onset and then staying level, the Fall falling more gradually (Fig. IV.1C).

In summary, there are two characteristics that distinguish the f_0 pattern of the Rise from the other two tonemes of the Salawati dialect. First, there is the high end target, which shifts over the available segmental domain, be it the vowel, the rhyme with voiced coda, or the rhyme plus the following toneless syllable. Second, the Rise features low level f_0 over most of the vowel with which it is associated. This feature is more context-independent that the high end target, and may be the sole characteristic distinguishing the Rise from the Fall in utterance-medial context when the syllable does not feature a voiced coda and the following syllable carries a toneme itself.

4.3.1.3. Falling toneme (Fall)

The Falling toneme is exactly what one would expect it to be on the basis of van der Leeden's description: in monosyllabic words marked with this toneme, f_0 falls from mid to low over the vowel (Figure IV.1A). This realization is constant over sentence contexts (Fig. IV.1B,C).

4.3.1.4. Inferential statistics

In a RM-ANOVA with mean f_0 as dependent variable, the effect of toneme was significant [$F(2,14) = 337.3$; $p<0.01$]. Sentence context was not significant [$F(1,7)$

=6.3; n.s.], and there was no significant interaction between toneme and sentence context [$F(2,14) = 3.0$; n.s.].

The same analysis, now with f_0 slope as the dependent variable, also reveals a significant effect for the variable toneme [$F(2,14) = 82.3$; $p<0.01$]. We saw above that the realization of the Rise on the vowel varies considerably between contexts – this toneme is realized as low-then-rising in the sentence-final context, but as merely low sentence-medially (compare Figs. IV.1B vs. IV.1C). Because of the realizational variation of the Rise in function of sentence context, sentence context has a significant effect on f_0 slope [$F(1,7) = 37.7$; $p<0.01$], and the interaction between toneme and sentence context is significant [$F(2,14) = 78.2$; $p<0.01$].

All three tonemes differ significantly from one another in post-hoc Scheffé tests, both with dependent variables mean f_0 and with f_0 slope [$p<0.001$ for each between-toneme comparison with each dependent variable]. These results indicate that the differences between tonemes illustrated in Figures IV.1A,B,C are no chance coincidence, but that instead they reflect genuine effects in the data set.

4.3.1.5. Conclusion

The acoustic realizations of the three tonemes of the Salawati dialect are in agreement with van der Leeden's (1993) impressionistic analysis. Considerable variation in function of sentence context was found for the Rise toneme. While in utterance-final position this toneme is encoded with a final rise at the end of the syllable, the high end target can shift to a following toneless syllable when the word carrying the Rise appears in utterance-medial position. In the context where the syllable following the target word is not toneless and the syllable with which the toneme is associated does not have a voiced coda, however, it seems likely that the Rise would be distinguishable from the Fall solely by the low level f_0 on the vowel of the syllable with which the Rise is associated.

4.3.2. Misool dialect

In absolute terms, the f_0 range of the tonal space of the Misool dialect is lower than that of the Salawati dialect (compare Y-axes in Figure IV.1A vs. Figure IV.1D). Mean f_0 over all tonemes is 4.39 ERB in the Salawati dialect as compared to only 3.71 ERB in the Misool dialect. I attribute this phenomenon to a chance difference between the basic f_0 levels of the speakers of both dialects. Irrespective of the fact that the speakers were matched for sex between dialects (4 male, 4 female), the speakers of the Misool dialect generally had lower voices than the speakers of Salawati dialect.

4.3.2.1. High toneme (High)

The High toneme of the Misool dialect is very similar to that of the Salawati variant (compare Figure IV.1A vs. Figure IV.1D). In the controlled data, the High of Misool Ma'ya rises from the middle of the tonal space to a maximum at the end of the vowel. As was the case for its Salawati cognate, however, this initial rise of the Misool High can be attributed to the low target of the preceding syllable.

4.3.2.2. Low toneme (Low)

The Low toneme is the Misool cognate of the Rise of the Salawati dialect: these tonemes are phonetically similar, and they tend to occur on the same words (see Appendix E, Tables 5 and 6). Like the Salawati Rise, the Misool Low features a drop of f_0 to the bottom of the tonal space at the beginning of the vowel (Figure IV.1D). But in contrast to the Salawati Rise, the final part of the Low does not feature much of a rise in the second half of the vowel. First, in utterance-final context f_0 remains about level in the latter part of the vowel (Figure IV.1E). Second, in sentence-medial context, f_0 falls throughout the vowel (Figure IV.1F), and, there is not as much of a high target on the toneless syllable following the word with which it is associated as there is in the Salawati dialect (compare Figure IV.4B vs. Figure IV.4A).

The contrastive feature of this toneme, therefore, is low f_0 rather than rising f_0. Impressionistically, this difference between the Rise of Salawati Ma'ya and the Low of Misool Ma'ya constitutes the perceptually most conspicuous point of variation between these dialects.

4.3.2.3. Falling toneme (Fall)

A comparison of the Fall tonemes of the Salawati and Misool dialects (Figure IV.1A vs. Figure IV.1D) reveals that the position of the Fall in the tonal space is radically different between the two dialects. In the Salawati dialect the Fall goes from the middle of the tonal space to the bottom, crossing the Rise toneme. In the Misool dialect, on the other hand, the Fall toneme falls from the top end of the tonal space to the middle, without ever approaching the Low toneme. In addition to starting higher in the tonal space, the slope of the Misool Fall is shallower. These two factors – f_0 onset value and contour slope – are responsible for the higher value of the Fall at the end of the vowel. They ensure that the contrast between the Fall and the Low is saliently marked, even when the Low is realized as a falling contour tone in sentence-medial context.

4.3.2.4. Inferential statistics

Univariate RM-ANOVAs with mean f_0 and f_0 slope as separate dependent variables both show a significant effect of toneme in a by-speakers analysis: [mean f_0: $F(2,14) = 295.5$; $p<0.01$; f_0 slope: $F(2,14) = 59.2$; $p<0.01$]. All three tonemes differ significantly from one another in post-hoc Scheffé tests, both with dependent variables mean f_0 and with f_0 slope [$p<0.001$ for each between-toneme comparison with each dependent variable]. Evidently, both mean f_0 and f_0 slope help distinguish the three tonemes from each another.

Sentence context does not appear to be an important factor determining f_0 mean and f_0 slope. It does not have a significant effect on f_0 slope: [$F(1,7) < 1$; n.s.], nor is there a significant interaction between toneme and sentence context [$F(2,14) = 3.4$; n.s.]. With mean f_0 as the dependent variable, there likewise is no significant effect: [$F(1,7) < 1$; n.s.]. The interaction between toneme and sentence context is just above the threshold set for significance [$F(2,14) = 7.6$; $p<0.01$].

4.3.2.5. Conclusion

Misool Ma'ya features a three-way tonal contrast similar to that of the Salawati dialect. This contrast is encoded with little variation over sentence contexts. Two tonemes, the Fall and the Low (Misool) / Rise (Salawati) are markedly different between the two dialects, and the between-dialect difference appears to be related to the way within-dialect contrast is maintained between the Fall and the Low (Misool) / Rise (Salawati). In the Salawati dialect, mean vowel f_0 of the Fall and of the Rise is about the same, but they are distinguishable by their slope – the Fall falling, the Rise rising (at least in most contexts). In the Misool dialect, on the other hand, the Low – being either level or falling – does not feature much of a rise. If the Fall of the Misool dialect were to be in the same position in the tonal space as it is in the Salawati dialect, there would be a potential perceptual problem of distinguishing the two tonemes. The higher position of the Fall in the tonal space of Misool Ma'ya precludes this problem. An explanation of this phenomenon is presented in § IV.4.3.

4.3.3. Laganyan dialect

4.3.3.1. High toneme (High)

The High toneme of Laganyan Ma'ya (Figure IV.1G) is very similar to the corresponding tonemes in the other two dialects. Impressionistically, it sounds higher, probably because it reaches its peak earlier in the vowel, i.e., closer to the intensity maximum, so that the f_0 maximum is more salient.

In one specific context, however, the High toneme of the Laganyan dialect is radically different from its tonal cognates in Salawati and Misool Ma'ya. When the syllable on which the High toneme is marked has a voiced coda, and appears in utterance-final context, a low tonal target is realized immediately after the lexical tone on this syllable. This is illustrated in Figure IV.5, which shows the average f_0 tracks of High and Rise tonemes on rhymes with a voiced coda. The tracks for the sentence-final context, featuring a rise-fall pattern, are contrasted with the tracks in sentence-medial context. Perceptually, the resulting tonal pattern consisting of steep rise followed by a steep fall is markedly different from what the High sounds like elsewhere.

The pronounced sentence-final fall is only present when the tone-bearing syllable has a voiced coda. This is evident from a comparison of Figure IV.5 (thick lines) with the f_0 tracks of items with either no or a voiceless coda in sentence-final context (thin lines in Fig. IV.1H).

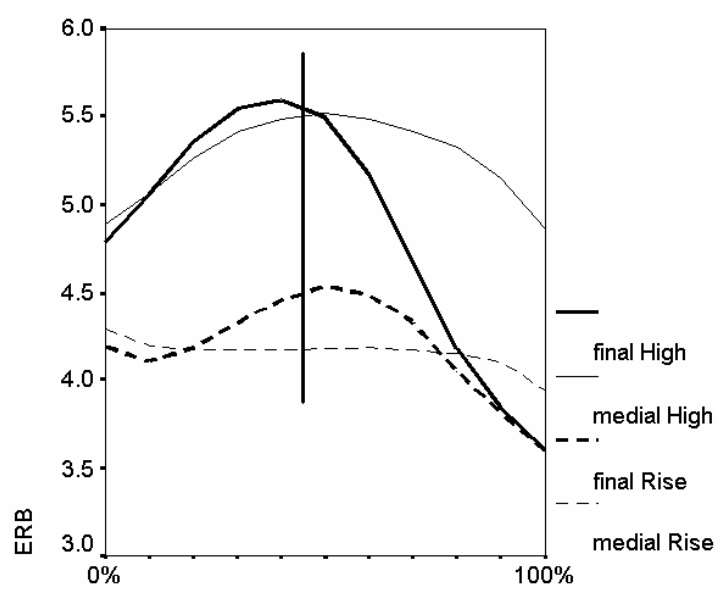


Figure IV.5: F_0 tracks of the high and rising tonemes on closed syllables with voiced coda in sentence-final and sentence-medial positions. Rhymes of monosyllabic words, consisting of vowel + /l,m,n/ in coda, are represented on a normalized time axis. The vertical line represents vowel offset (averaged). Based on 3 pseudo-minimal pairs (6 items) by 7 speakers.

In § IV.4.4, we will discuss this phenomenon in more detail, and look at data from the Salawati dialect that shed light on its origin.

4.3.3.2. Falling toneme (Fall)

This toneme has the same trajectory as in the Salawati dialect: f_0 falls from the middle of the tonal space to the bottom. There is no difference in realization between sentence contexts.

4.3.3.3. Rising toneme (Rise)

The Rise of the Laganyan dialect consists of a rise in the lower half of the tonal space (Figure IV.1H). In contrast to its tonal cognates, the Rise of the Salawati dialect and the Low of the Misool dialect, the fall in f_0 immediately after vowel onset is so small that it is not perceptually salient as a fall. The absence of an initial low target makes the Laganyan Rise sound quite different from its tonal cognates. In fact, the acoustic shape is similar to that of High, which only differs in the register where the rise takes place.

A comparison of the Rise in sentence-final and in sentence-medial contexts (Figure IV.1H vs. Figure IV.1I) reveals that while in sentence-final position the high

end target of the Rise is clearly marked on the vowel, this is not the case in sentence-medial position, where the Rise is virtually indistinguishable from the Fall. The data available for the following syllable do not show evidence of a shift of the high end target of the Rise to the following syllable (Figure IV.4C). Unfortunately, however, these data are not comparable with those for the other dialects. Whereas both in the Salawati and in the Misool dialects the target word is followed by /saˈpo[12]/ 'not', this corresponds to /haˈpo/ (same meaning) in Laganyan, which is commonly reduced to /ˈpo/. In other words, while in the Salawati and Misool data the target word is followed by a toneless syllable, it is not in Laganyan. Indeed, rather than being determined by the preceding toneme, the f_0 value at the beginning of /ˈpo/ is broadly the same irrespective of the preceding toneme (see Figure IV.4C). This suggests that f_0 on /ˈpo/ is determined by its own Fall toneme, and that, as a consequence, it is not possible to determine whether the high target of the Rise shifts rightward when the following syllable is toneless. However, it is possible to conclude that at least when the Rise is followed by a syllable that carries a toneme, it is indistinguishable from the Fall. In this respect there is an important difference between Laganyan and the Salawati dialect. In the latter, the encoding of the Rise is not limited to the high end target. Even without this correlate, the Rise is still distinct from the Fall because of the low level f_0 during the vowel of the target word. This feature is absent in the Rise of the Laganyan dialect, so that there is actually contextually conditioned loss of tonal contrast. We will come back to it in § IV.4.4.

The phenomenon already reported for the High toneme in sentence-final context also happens with the Rise. That is, when the Rise is encoded on a syllable with a voiced coda in sentence-final position, then both the Rise and a following falling tone are compressed on this syllable (Figure IV.5). Just as is the case for the High, the Rise toneme sounds markedly different when it is followed by this low tonal target.

4.3.3.4. Inferential statistics

Just like in the Salawati and Misool dialects, both mean f_0 and f_0 slope are determined by the factor toneme in a statistically significant way in univariate repeated-measures ANOVA analyses [mean f_0: $F(2,12) = 767.9$; $p<0.01$; f_0 slope: $F(2,12) = 251.4$; $p<0.01$]. The High, Fall and Rise tonemes differ significantly from each another in post-hoc Scheffé tests, both with dependent variables mean f_0 and with f_0 slope [$p<0.001$ for each between-toneme comparison with each dependent variable]. This means that both mean f_0 and f_0 slope play a role in distinguishing the three tonemes from each other.

Because the distinction between the Rise and the Fall is largely lost in sentence-medial context, we find significant effects of sentence context on mean f_0, and in particular on f_0 slope. For mean f_0, sentence context is significant [$F(1,6) = 14.1$; $p<0.01$], and there is a significant interaction between toneme and sentence context [$F(2,12) = 34.0$; $p<0.01$]. The interaction is significant because while the Rise is considerably lower in sentence-medial context, the other tonemes do not feature a difference of equal size. As for f_0 slope, here too we find sentence context to be

significant [$F(1,6) = 163.7$; $p<0.01$], and there is a significant interaction between toneme and sentence context [$F(2,12) = 51.8$; $p<0.01$]. The likely cause is the same as for the effect of context on mean f_0: the loss of the high end target in sentence-medial context.

4.3.3.5. Conclusion

The lexical tone system of Laganyan Maˈya, though similar to that of the Salawati and Misool dialects, presents two phenomena that set it apart. First, there is the pre-boundary fall, the distribution of which is limited to syllables that feature a voiced coda. The pre-boundary fall is intriguing, as it causes the Rise and the High tonemes to sound completely different depending on its segmental environment and the sentence context. Second, when the Laganyan Rise is followed by a syllable that carries a toneme itself, it is indistinguishable from the Fall.

4.4. General discussion

4.4.1. Maˈya is a tone language

Van der Leeden (1983, 1993) claimed that Maˈya is a tone language. At odds with this analysis is Donohue's (1997) classification of Maˈya as a pitch-accent language. The above acoustic analyses show that f_0 encodes a three-way paradigmatic prosodic contrast in monosyllabic words in three dialects of Maˈya. The classification of Maˈya in Donohue (1997) is not satisfactory, because a pitch-accent system can only account for a binary tonal contrast in monosyllabic words: a monosyllabic word either carries a pitch-accent or not (see § III.1.1). A three-way tonal contrast in monosyllabic words is therefore inherently beyond the scope of such a word-prosodic system.

In the following sections, the lexical tone systems of each of the three dialects are discussed from the perspective of dialectal variation.

4.4.2. Synchronic variation in the Rise of pre-split Maˈya

Whereas the Fall and the High tonemes are fairly similar both within and between dialects (Figure IV.1), the realization of the Rise (Salawati, Laganyan) / Low (Misool) varies considerably in both ways. This toneme, therefore, constitutes the key to understanding the diachronic development in tonal realization from Maˈya before to dialect split to the three dialects under investigation.

The various realizations of the Rise / Low toneme can be accounted for best by hypothesizing that in pre-split Maˈya, the realization of this toneme varied between sentence contexts in the way the Rise of the Salawati dialect does. According to this hypothesis, the Rise of pre-split Maˈya featured a high end target that could shift beyond the syllable with which the Rise is associated.

This hypothesis is attractive, as it provides an explanation for (i) the between-context variation in the realization of the Rise in the Salawati and Laganyan dialects; (ii) the origin of the Misool Low and the position of the Fall in the tonal space of Misool Maˈya. The second point will be elaborated next.

4.4.3. A push-chain tonal change in the Misool dialect

The realizations of two of the Misool tonemes – the Low and the Fall – differ from those of their cognates in the Salawati dialects. On the assumption that the Misool Low developed from a stage where its acoustic realization was similar to that of the Salawati Rise, these differences can be explained as follows. The pre-split Maˈya Rise was both low and rising, and the latter feature was not consistently realized over contexts. Of the two (context-dependent) variants hypothesized for pre-split Maˈya, with and without final rise on the syllable lexically marked for tone, Misool Maˈya retained the latter, now generalized over all contexts. To speak with Ohala (1989), the Misool Low was drawn from a pool of synchronic variation.

The upward shift of the Fall toneme of the Misool dialect can be explained as a reaction to the loss of the high end target in what had come to be a Low rather than a Rise toneme. That is, as the Rise toneme of pre-split Maˈya became a level or falling Low toneme in the Misool dialect, tonal contrast between this toneme and the Fall was reduced. Thus, in a push-chain fashion, the perceptual contrast between the Misool Low and Fall was maintained by the upward shift of the Fall.[49]

This phenomenon illustrates that the diachronic change of a lexical tone cannot be considered independent from the tone system it is part of, just like a diachronic change in a vowel can only be fully understood in relation to the other vowels with which it shares the vowel space.

4.4.4. Loss of tonal contrast and a boundary tone in the Laganyan dialect

In terms of its lexicon and its segmental phonology, Laganyan is the most dissimilar of the three dialects investigated (see § II.3.1.2.3 and Appendix A). The Laganyan Maˈya tone system, however, is very similar to those of Salawati and Misool Maˈya. The number of tonemes is the same, and their acoustic realizations map closely to those of the corresponding tonemes in the other dialects. This high degree of similarity supports an interpretation of Laganyan as a dialect of Maˈya. From this perspective, the differences between Laganyan and the Salawati and Misool dialects of Maˈya are interpreted to postdate the dialect split. However, there are two

[49] King (1969) argues that there are no push-chains, only drag-chains. For the Misool Maˈya tone shift, however, a drag-chain analysis is less attractive than a push-chain analysis, because there is no evident reason for the Fall to initiate the change by its upward shift. The push-chain interpretation is preferable because there is an explanation for it. All dialects show evidence of synchronic, between-context variation in the realization of the Rise. And it is precisely the realization of the Rise which encroaches on the Fall which has been generalized over all contexts in the Misool dialect.

important differences in tonal realization, which distinguish Laganyan from the Misool and Salawati dialects.

At least when it is followed by a syllable carrying a toneme, the Rise is indistinguishable from the Fall in sentence-medial context. This phenomenon can be interpreted as a case of contextually conditioned loss of tonal contrast. In the Salawati dialect, the contrast between the Rise and the Fall is assured by the difference in tonal pattern on the vowel with which the Rise is associated: low level f_0 for the Rise, and f_0 falling from mid to low for the Fall (Figure IV.1C). So even without the high end target, the Rise is perceptually distinct from the Fall. In the Laganyan variant, on the other hand, the Fall and the Rise are identical but for the high end target of the Rise, so that they are indistinguishable in the absence of this high end target.

Second, the High and the Rise tonemes are followed by a falling tone in one specific context: when the syllable carrying one of these tonemes features a voiced coda, and is located in sentence-final position (Figure IV.5 – in bold). Because this falling contour is only added in sentence-final position, it can be interpreted as a boundary tone. This pre-boundary fall is not realized on syllables that do not feature a voiced coda (Figure IV.1H – thin lines).

Although tonal realization is well known to vary in function of a following phrase boundary (Hyman 1978, Ladd 1996), the association as we find it in Laganyan is uncommon. Hyman (1978:265) notes that in the Bantu language Haya, a High tone in final position becomes a Low tone. Similarly, Chang (1958 [in Ladd 1996:150]) reports that in Chengtu Chinese, all five tonemes have a higher end frequency when they occur in phrase-final position in a question. The phenomenon observed in Laganyan, however, is of a different nature, in that the boundary tone follows the lexical tone sequentially, rather than that it modifies it. For example, whereas the low-falling toneme of Chengtu Chinese becomes level when in pre-boundary position in a question, the Laganyan Rise does not become level under influence of the low boundary target. I found no reference to such phenomenon in the literature on tone languages like Chinese or Thai, but it is quite common in intonational systems. In English for example, it is not uncommon to find a pitch-accent and a boundary tone configuration realized on a single syllable, with f_0 making all the rises and falls associated with the individual tones (Ladd 1996:132). Likewise, in Swedish, which features a tone contrast that is syntagmatically restricted to the stressed syllable, the sequence of a pitch-accent and a boundary tone can be associated with a single syllable (Bruce 1977).

This is the phenomenon we find in Laganyan, where the presence of the boundary tone is conditioned by a segmental factor: it is only present when the tone-bearing syllable has a voiced coda. This again is reminiscent of intonational systems, where complex configurations of accent and boundary tones can be truncated if there is only a limited amount of segmental material to encode them on (Ladd 1996; Grabe, Post, Nolan and Farrar 2000). Following similar accounts of intonational languages, therefore, the phenomenon observed in Laganyan can be analyzed as follows.

Laganyan features a boundary tone, associated with the last syllable before a pause. This boundary tone is truncated if the final syllable does not have a voiced coda.

A comparison with the other dialects suggests that this boundary tone was not present in pre-split Ma'ya. Still, its origins are apparent in an instantiation of synchronic variation in the Salawati dialect. Figure IV.3 shows the Rise and High tonemes of the Salawati dialect in pre-boundary position, both with and without a voiced coda. For both tonemes, the graph shows that when the syllable has a voiced coda, f_0 dips after it has reached the high end target. This final dip exactly mirrors the Laganyan boundary tone phenomenon in segmental conditioning and sentence context. It is therefore justified to hypothesize that the Laganyan boundary tone developed from such stage a stage of synchronic variation.

4.4.5. Is the Laganyan dialect losing its lexical tone system?

Neither the contextually limited loss of tonal contrast nor the segmentally conditioned boundary tone constitute undeniable indications that tone is on its way out in Laganyan. As for the loss of tonal contrast, various Chinese tone languages have a reduced inventory of contrasts in non-prepausal positions (Schuh 1978). And the boundary tone phenomenon does not compromise the salient encoding of the High and Rise tonemes.

However, both of these phenomena make the Laganyan tone system less transparent, and it is interesting that these developments have taken place in the dialect that, based on non-linguistic considerations, is most likely to lose its lexical tone system. These considerations are the following. First, the community of Laganyan speakers consists of only two small villages, each with no more than 125 native speakers. This small dialect community is surrounded by villages that speak intonational languages: the Waigeo dialect of Biak, and Ambel. The strong influence of Beser on Waigeo has been reported repeatedly (Hartzler 1978, van der Leeden 1993). Beser and Ambel villages Ambel are located in and around Mayalibit Bay, where the Laganyan villages are located. Second, the other two Ma'ya dialects of Waigeo, Kawe and Wauyai, currently do not feature lexical tone contrasts. These dialects have already lost their lexical tone system, possibly under the influence of the above-mentioned outside pressures. The future will tell whether the phenomena that set apart the Laganyan tone system from those of the other dialects constitute the first steps towards the loss of its tone system.

4.4.6. Triggers of diachronic change in the tone systems of Ma'ya dialects

The diachronic changes that have taken place in the Ma'ya tone system between the stage that preceded the dialect split and the dialects under investigation can be attributed to two underlying triggers. Both of these are listed as important factors of historical tonology in Hyman (1978). One is tonal attraction (accentual attraction in Hyman [1978]); the other is the effect of a boundary on the tonal contour of an utterance. Tonal attraction refers to the phenomenon whereby toneless syllables take

their tonal realization from neighboring syllables that do carry a tone. In this way, the Rise of pre-split Ma'ya, and of the Salawati and Laganyan dialects, has a high end target that shifts to the following toneless syllable.

Second, a boundary may lead to a lowering of f_0 at the end of the tonal contour. We see this weakly in the Salawati dialect (Figure IV.3), and clearly in the Laganyan variant (Figure IV.5). In both cases it is limited to the syllables with a voiced coda, where there is more segmental space to encode the tonal targets on.

But while these potential causes of diachronic change were germinating in each of the three dialects under investigation, their tone systems have gone very different ways. This is clearest in the development of the Rise toneme. The Misool dialect generalized one of the synchronic variants of the Rise over all contexts. This set off a push chain process that ensured tonal contrast between the Rise and the Fall. The Salawati and Laganyan dialects, on the other hand, maintained the synchronic variation, risking potential ambiguity between the Rise and the Fall. In Laganyan these tonemes have become actually indistinguishable in one context.

4.5. Summary

This chapter dealt with dialectal variation in the lexical tone system of Ma'ya. Representative acoustic data were collected from the Salawati, Misool, and Laganyan dialects, and on the basis of these data, an account was given of their tone systems, and of how these tone systems compare to one another. The objective of this study was to gain insight in diachronic development in lexical tone systems.

The Rise toneme features the most variation, both within and between dialects. Evidence is presented that the diachronic, between-dialect variation in the Rise toneme is due to synchronic between-context variation (cf. Ohala 1989). While this synchronic variation is still evident in the Salawati dialect, the two other dialects developed in radically different directions. In the Misool dialect, one of the realizations of the Rise was generalized over all contexts, and this triggered a push-chain style tonal change, in which another toneme, the Fall, shifted upward in the tonal space, ensuring perceptual contrast with the Rise. In the Laganyan dialect, on the other hand, the tonal contrast between the Fall and the Rise is lost in one context. The Laganyan dialect also developed a boundary tone which only surfaces when the syllable with which it is associated has a voiced coda. These developments suggest that Laganyan may be losing its lexical tone system. This has already taken place in Kawe and Wauyai, the other two Ma'ya dialects that are used on Waigeo.

5 A second RA tone language: Matbat

5.1. Introduction

This chapter deals with the word prosodic system of Matbat. Matbat is the language of 1,000 to 1,500 people on Misool. This language was introduced in § II.3.2, where it was noted that very little is known about Matbat.

This study reveals that Matbat is a tone language. This claim is supported with phonological and acoustic evidence in § V.2 and § V.3, respectively. This makes Matbat the second tone language of the Raja Ampat archipelago, next to Ma'ya (van der Leeden 1993). The fact that Matbat has lexical tone sheds light on the historical context of tonogenesis in the Raja Ampat archipelago. This issue is discussed in § V.4.

5.2. Lexical tone in Matbat: phonological description

Matbat has five lexically contrastive tonemes. These are an Extra High Fall, a High Level, a Low Rise, a Low Level, and a Fall.[50] Minimal set examples illustrating some contrasts are listed in Table V.1. A longer extensive list of sets of words minimally distinguished by lexical tone can be found in Appendix E, Table 10.

The Fall toneme has two allotones: a Rise Fall contour tone and a Low Fall contour tone. While these tones are perceptually distinct from one another, there is no minimal pair evidence in support of the hypothesis that they are lexically contrastive, i.e., that they are tonemes. The distribution of these allotones is mostly complementary: the Rise Fall allotone is associated with open syllables, and the Low Fall allotone with closed syllables. This is evident from the examples in Table V.1 and in Table 10 of Appendix E. However, variation between these two allotones is free in the sense that, at least in some cases, open syllables that carry the Rise Fall allotone can also be uttered with the Low Fall allotone. This has been observed for the word /fa^{121}/ 'bad': it is uttered by some speakers with the Rise Fall contour and by others with the Low Fall.

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[50] Note on transcription. The Matbat tones are transcribed by the same convention used for the transcription of the Ma'ya tonemes. That is, the speaker's f_0-range is represented by a numeric scale, going from one (low) to four (extra high). Within this range, level tones are represented by single digits, and contour tones by multiple digits. In this way, the Extra High Fall is /^{41}/, the High is /^{3}/, the Rise is /^{12}/, and the Low is /^{1}/. The Fall toneme has two allotones (see below): the Low Fall /^{21}/, and the Rise Fall /^{121}/.

Table V.1: Monosyllabic minimal set examples illustrating the Matbat toneme inventory.

Extra High Fall	High (level)	Low Rise	Low (level)	Fall	
				Rise Fall allotone	**Low Fall allotone**
		na^{12}n 'animal'	na^{1}n 'betel leaf'		na^{21}n 'name'
mo^{41}n 'areca nut'			mo^{1}n 'heavy'		
	to^{3}l 'three'	t-o^{12}l '1PIN-stand'			to^{21}l 'egg'
de^{41} 'to throw'	de^{3} 'house'			de^{121} 'sick'	

Words with the Low Fall allotone on the final syllable often have an epenthetic final /o/ in phrase-final context. This is reminiscent of Ma'ya, where words that carry the Fall toneme always get an epenthetic final /o/. The Matbat Low Fall and the Ma'ya Fall are acoustically identical, so it is likely that one of them has influenced the other. It is more probable that Ma'ya influenced Matbat rather than the way around, since Matbat is only used on Misool, and could not have exerted an influence on the Waigeo and Salawati variants of Ma'ya, which also feature the epenthetic final /o/.

The Matbat lexicon is largely monosyllabic. While collecting a 300-item wordlist, I have not encountered any monomorphemic words with more than three syllables. Polysyllabic words often have a weak (toneless) initial syllable vowel /a/. In monomorphemic polysyllabic words, various syllables can carry tones. Examples: /kamo^{12}w/ 'star', /wu^{3}yte/ 'sea shore', /sapu^{41}lu^{12}y/ 'round', /bi^{3}mbo^{121}mpu/ 'butterfly'.

Most polysyllabic function words carry the Low Fall allotone of the Fall toneme on one syllable, e.g. /ya^{21}ka/ 'I' and /hafo^{21}/ 'they', but /po^{121}re/ 'not yet'. Some function words are prosodically weak, i.e., they are usually reduced or without any prominence – a case in point is the negative marker /po/.

There are perceived prominence contrasts in relation with the lexical tones. For example, in polysyllabic words with only one tone, the syllable with the tone stands out from among the neighboring toneless syllables. Also, in words with two tones, often one seems more prominent to me, e.g. the penultimate one in /sapu^{41}lu^{12}y/ 'round'.[51] However, there is no evidence for lexical stress as a phonological property independent of lexical tone.

[51] This is probably due to the fact that my native language, Dutch, is intonational, with high f_0 associated with stressed syllables.

5.3. Lexical tone in Matbat: acoustic analysis

5.3.1. Motivation and approach

The above phonological description of the Matbat tone system is based on impressionistic perception by the researcher. It can be corroborated quantitatively by means of an acoustic analysis of the hypothesized tones (tonemes and allotones). For example, if a word like /mo^{41}n/ 'areca nut' is distinguished from / mo^{1}n/ 'heavy' solely by its tone pattern, then the fundamental frequency (f_0) values should differ in a significant way, because f_0 is the acoustic correlate of perceived pitch or tone. This prediction can be tested by an analysis of variance (ANOVA). Also, if the analysis of the tone system hypothesized above is correct, then it should be possible to distinguish the tonemes and allotones from one another, again on the basis of their acoustic realization. Such a classification of the tonemes can be carried out by means of Linear Discriminant Analysis (LDA). The latter test is more powerful: while the ANOVA analysis merely requires a certain degree of consistent variation between all tones, the LDA analysis will show whether this variation is large and consistent enough for the tones to be classified successfully.

Apart from supporting the mere fact that Matbat has the complex tone system set out above, this acoustic analysis is also worthwhile because it gives a detailed account of the acoustic realization of the tones. In many languages, the realization of word prosodic patterns varies in function of the position of a word in the utterance. For example, both intonational (e.g. English [Ladd 1996 and references there]) and tonal (e.g. Chengtu Chinese [Chang 1958 in Ladd 1996:150], Laganyan Ma^{l}ya [see Chapter IV]) languages have been reported to feature tonal configurations specific to certain phrasal boundaries. Also in many languages, the final syllable of a word located at the end of an intonational phrase has a relatively longer duration (Vaissière 1983, Maddieson 1997). This phenomenon may well be a linguistic universal. In order to determine whether the tones of Matbat are affected by such context-conditioned differences in the realization of word prosodic patterns, the acoustic realization of tones is investigated in two sentence contexts, both in the middle and at the end of the sentence.

The analysis is based on minimal sets like those listed in Table V.1. A number of minimal sets were selected, so as to include minimal pairs between all tonemes. By including instantiations of all tonal contrasts, it is ensured that the hypothesized tonemes are indeed phonemic. A disadvantage of this approach, however, is that the data set is not segmentally balanced. Because the minimal sets each involve two or three tones rather than all six of them, the sets of monosyllabic words analyzed for each toneme vary between themselves in segmental structure. This opens the door to unwanted variation between tonemes in syllable structure and segment type. This seems preferable, though, to the risk of taking allotones for tonemes.

The target words were recorded sentence-medially and sentence-finally in a fixed frame sentence. F_0- and duration-related measures of the rhyme of the target words were subsequently analyzed by means of ANOVA and LDA.

5.3.2. Data collection and data analysis[52]

5.3.2.1. Speakers

I recorded 8 native speakers (4 male, 4 female) of the Matbat language. All speakers spoke the variant of the village of Mage (southeast Misool).[53] Seven of them used Matbat in most of their daily interactions. The eighth was Absalom Jemput, a 20-year old male who had moved from Mage to the city Sorong two years earlier, and who assisted me with data collection. The informants were paid a fee.

5.3.2.2. Materials and procedure

The materials used in this analysis consist of 48 monosyllabic lexical items, including 9 three-way minimal sets. They are listed in Appendix E, Table 10. Some minimal sets were found while recording an extended Swadesh-list. The majority, however, were found by Absalom Jemput. At a later stage, the words were checked with another, older native speaker. The lexical items were not segmentally balanced across the hypothesized tones, so that unwanted segmentally driven variation in fundamental frequency (f_0) may occur. The lexical items were distributed semi-randomly over three blocks, in such a way that members of a minimal set were in different blocks.

The data elicitation procedure is the same as the one used to collect data on Maˈya word prosody (see § III.3.2.2). During the recording sessions, all interactions between the researcher and the informant took place in Indonesian. The procedure was the following. The native speaker was orally presented with an Indonesian lexical item, the Matbat translation of which he or she was to utter out loud. If need be, more information about the meaning or the usage of the word in Matbat was given. Rarely, a speaker was unable to translate the word on the basis of this information, or would offer a semantically related alternative. Then the researcher wrote the Matbat word on paper. If the speaker did not recognize the word, no further attempts were made to elicit it.

The response, a lexical item in Matbat, was recorded in three contexts (see example V.1): (a) in isolation; (b) embedded sentence-finally in a carrier sentence; (c) embedded sentence-medially in a carrier sentence. Context (a) – in isolation – served as a check to determine whether the informant knew the requested word. With some informants context (a) was not recorded, and none of the context (a) data were analyzed. Context (b) and (c) were recorded twice.

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[52] The acoustic data on which this chapter is based were collected during a five-day fieldwork visit to Mage (southeast Misool) in March 2000. Absalom Jemput, who helped me collecting the data, found most of the minimal tone sets.

[53] As noted in § II.3.2.1, the issue of dialectal variation in Matbat has not yet been investigated.

Because the context frames were the same throughout the recording session, the target words stood out as new information within the utterance they appeared in. The interaction with each informant lasted approximately one hour, interrupted by two short breaks between the blocks.

(5.1)

Researcher [in Indonesian]:
ɟalan
road

Informant [in Matbat]:

(a) ma^{41} [citation form]
road

(b) hafo^{21} fu^{21} ma^{41} [sentence-final in carrier sentence]
PRS3P say road

They say road.

(c) hafo^{21} fu^{21} ma^{41} po [sentence-medial in carrier sentence]
PRS3P say road NEG

They do not say road.

The recordings were made using a Sony WM-D6C tape recorder (featuring user-controlled input level and a constant-speed mechanism) and a Shure SM10A directional close-talking microphone (head mounted with wind shield, ensuring a constant mike-to-mouth distance).

5.3.2.3. Data analysis and statistics

All sentences recorded in contexts (b) and (c) of example V.2 were digitized, at a sampling frequency of 22,050 kHz. Sentences that were of a bad quality, in terms of background noise, voice quality or pronunciation (e.g. hesitations), were excluded from the analysis. The total number of sentences analyzed was 1,484 (2-4 realizations [1-2 sentence-medial + 1-2 sentence-final] * 48 lexical items * 8 speakers). F_0-tracks of these recorded sentences were produced by means of the accurate autocorrelation algorithm of Boersma (1993), which is implemented in Praat (Boersma & Weenink 1996). These F_0-tracks were hand-corrected for tracking errors where necessary. The target words were segmented manually on the basis of waveform and spectrogram representations of the recorded sentences. Apart from duration, which was measured for the vowel, all other measurements were made over the voiced part of the rhyme of the target word. This domain consists of the vowel plus any voiced coda. The following measurements were made:

- F_0 maximum, mean, and standard deviation. Data points were expressed in Hertz, as well as in terms of the psycho-acoustic ERB-scale.[54] When voicing began slightly after vowel onset, the domain of measurement began at the first voiced ten-millisecond frame in the domain. The same procedure was applied, mutatis mutandis, when voicing ended before the end of the domain (as determined by manual segmentation).
- The f_0 values 10 milliseconds (ms) after the beginning of the vowel, and 10 ms before the end of the voiced part of the rhyme. By making these f_0 onset and offset measurements at 10 ms from the edges, the influence of segmental f_0 is reduced.
- Two time-related measures were made: vowel duration (in ms) and time of the f_0 maximum. Time of f_0 maximum is calculated as the division of the time span (in ms) between vowel onset and the f_0 maximum, by the time span (also in ms) of the voiced part of the rhyme, be it vowel or vowel plus voiced coda. The resulting value is 0 when the maximum is located at vowel onset and 1 when it is located at the end of the voiced domain.
- A measure of the slope of the f_0-track. Slope is computed by measuring mean f_0 (expressed in ERB) from the beginning of the vowel to its temporal mid-point (part1), and from the mid-point up to the end of the vowel (part2). The ERB value for part2 is subtracted from the ERB value for part1. The slope value is higher than 0 if f_0 falls throughout the syllable, and it is lower than 0 if f_0 rises through the syllable. It is close to 0 if f_0 is level, or if the domain measurement shows an equal-size mirrored change in f_0 in both parts of the vowel.

Means and standard deviations were calculated as descriptive statistics. Repeated measures-style (RM) ANOVAs[55] were carried out with fixed factors tone (Extra High Fall / High / Rise / Low / Rise-Fall / Fall) and sentence-context (medial / final), and a random factor speaker. As a criterion to determine significance, alpha was set at the value of 0.01 rather than at 0.05, because the number of tokens is large.

Linear Discriminant Analysis (LDA) was used to compare the degree of success with which the above acoustic measures can distinguish the six tones from one another. When combinations of acoustic parameters were evaluated, the stepwise approach was used, whereby a parameter is only added to the equation if its *F* value is sufficiently high to offer a significant contribution to the discrimination result (*F* to enter: > 3.84; *F* to remove: < 2.71). Both for the RM-ANOVA and the LDA analyses, all measures were standardized (z-transformed) per speaker to normalize for between-speaker variation in acoustic register and range.

[54] The ERB-scale is introduced in § III.3.2.4.

[55] RM-ANOVA and LDA are introduced in § III.3.2.5.

5.3.3. Results and discussion

5.3.3.1. The effect of tone on f_0 and duration

Figure V.1 shows averaged F0-tracks of the 6 tone patterns (5 tonemes, one of which with two allotones). The Extra High Fall stands out with its exceptional range: on average, f_0 falls 2 ERB (95 Hertz) for this tone. The other tones are closer together in the tonal space, but each is clearly distinct from the others. Descriptive statistics are listed in Appendix E, Table 11.

Table V.2: Results of univariate RM-ANOVAs.

Criterion	**Factor Tone (all $p < 0.01$)**
Duration of vowel	F (5,35) = 45.8
F_0 mean	F (5,35) = 222.1
F_0 standard deviation	F (5,35) = 274.2
F_0 at vowel onset	F (5,35) = 452.2
F_0 end value	F (5,35) = 163.2
F_0 maximum	F (5,35) = 209.2
F_0 slope	F (5,35) = 516.9
Timing of maximum	F (5,35) = 325.4

The factor tone has a significant effect on all acoustic measures, in particular f_0 slope and f_0 at vowel onset (see Table V.2). The significant effect of vowel duration as a function of tone is small in relation to the effects of the f_0-related measures. It can be explained as the result of various factors. On the one hand, complex tones, with more high or low f_0 targets, may intrinsically have a longer duration than tones with less f_0 targets, as it takes more time to mark, for example, a fall rise fall contour than a fall contour. In line with this prediction, the Rise-Fall, which has the most f_0 targets (low-high-low), also has the longest vowel duration (see Appendix E, Table 11). Apart from this inherent durational difference between tones, there are two additional factors, which clearly have determined the variation in vowel duration between tonemes in the data set.

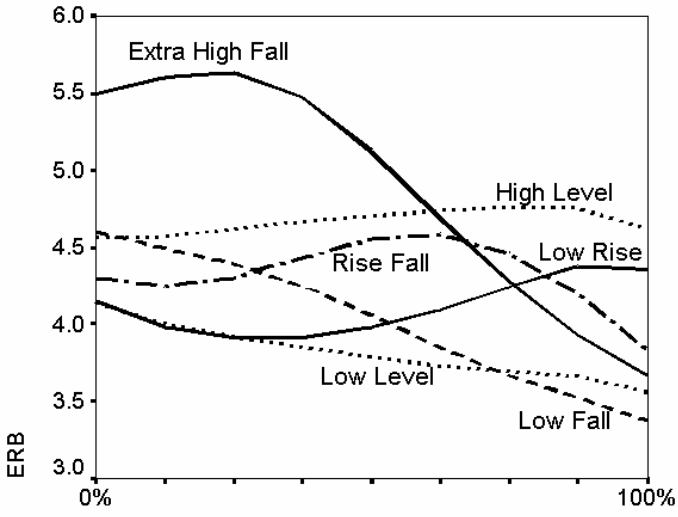

Figure V.1: F_0-tracks of the 6 tones on the voiced part of the rhyme (vowel plus voiced coda, if any) of monosyllabic words. The tracks are represented on a normalized time axis, and plotted against f_0 (in ERB).

First, words with the Low Fall allotone often have an epenthetic /o/ added at the right word-edge when the word appears in sentence-final position (§ V.2). This causes the vowel on which the Low Fall is encoded to be penultimate rather than final. In the sentence-final condition, therefore, the Low Fall is less affected by final lengthening than the other tones are. Not only does the Low Fall have the shortest duration of all tones (159 ms), its also shows the smallest effect of final lengthening of all tones.

Second, some tonemes are represented in the data set predominantly by closed syllables, while others are represented predominantly by open syllables. The duration of a given vowel that is checked by a coda consonant is relatively shorter than that of the same vowel in an open syllable (Klatt 1976, Maddieson 1985). This phenomenon is evident from the tone data under investigation. On average, the vowels of open syllables have a duration of 213 ms, but the duration of the vowels in closed syllables is only 170 ms. The difference in vowel duration between tones can therefore be attributed to some extent to the variation in closed/open syllable-words for each tone.

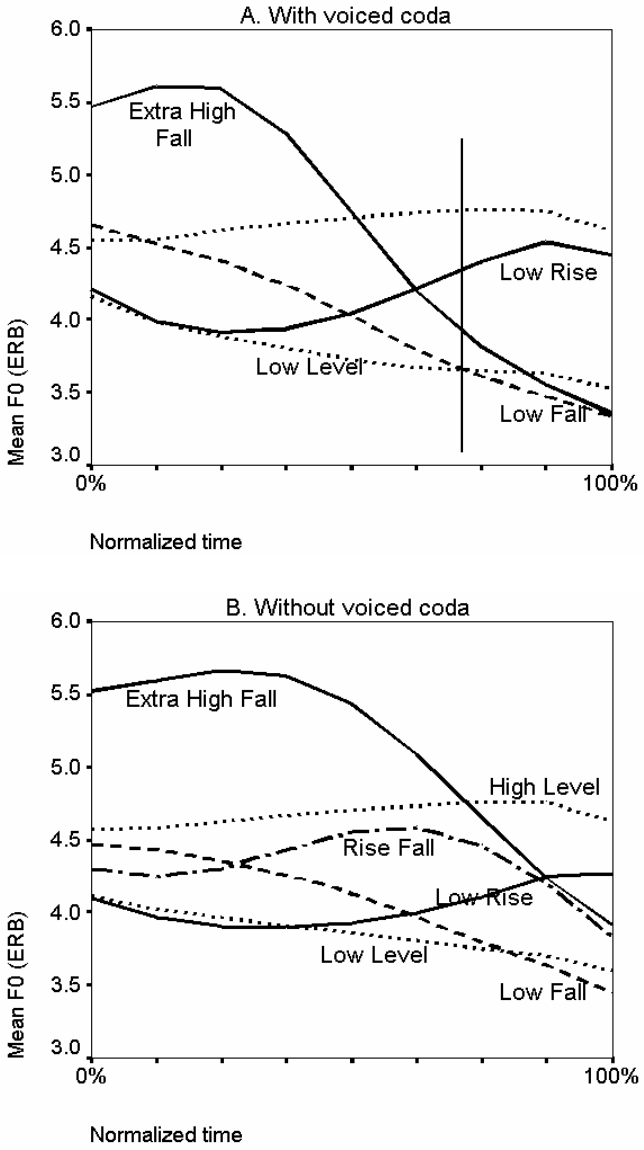

Figure V.2: F_0-tracks of the 6 tones on monosyllabic words with voiced coda (A), and without voiced coda (B). F0-tracks are represented on a normalized time axis, and plotted against an ERB scale. The vertical line in V.2A marks the average location of the coda onset. V.2A lacks a track for the Rise Fall – see discussion of complementary distribution of Fall allotones in § V.2.

For example, the tone with the longest average vowel duration, the Rise-Fall (212 ms), is represented in the data set by open syllable words only. The tone with the

shortest average duration, the Low Fall (159 ms), is represented by five closed-syllable words and only one open-syllable word.[56] The effect of syllable structure exacerbates the effects of the two earlier-mentioned causes for variation in vowel duration in function of tone. The Rise Fall already was singled out by the complexity of its tonal targets, and likewise, words with the Low Fall underwent final final-lowering to a lesser extent than other tonemes, because of the epenthetic /-o/ in that context. When the above ANOVA with factor tone and vowel duration as the dependent variable is repeated with open syllables only, the effect is reduced considerably [F (5,35) = 29.37, $p < 0.01$].

The domain with which the Matbat tonemes are associated appears to be the rhyme, irrespective of its constituent structure. A comparison of the tones with (Figure V.2A) and without (Fig. V.2B) voiced coda reveals that there is no conspicuous difference in tonal realization between these two syllable types. All tones are marked with greater f_0-excursions on syllables featuring a voiced coda (Figure V.2A): the Low Rise goes higher, the tones ending in a low target go lower. These differences can be explained as follows. When the syllable features a voiced coda, there is more segmental material to mark the f_0-pattern of the tone on. In other words, the difference in tonal realization between syllables with and without a voiced coda can be interpreted as a mild case of truncation for syllables without a voiced coda.

It was mentioned above that the factor tone has a significant effect on all acoustic measures, including vowel duration. In particular for vowel duration, where the size of the effect was small, this significant result could be due to the large size of the data set. It is therefore worthwhile analyzing the effect of tone by means of a more critical analytic method, such as Linear Discriminant Analysis (LDA). In this investigation, LDA is used to determine the success with which the six tones can be distinguished from one another in the data set, on the basis of one or more of the acoustic measures. The LDA results for successful discrimination of tones are presented in Table V.3.

Of all single postdictors, the measure f_0 slope yields the best result: 67.7 percent of the cases can be correctly classified for their tone on the basis of this measure alone. The other f_0-related measures give substantial correct classification scores as well. Relative to a 16.6 chance level baseline, these results constitute unmistakable evidence that the f_0-related measures are crucial to the tone distinction. Vowel duration, on the other hand, hardly raises the correct classification above the chance-level baseline. This shows that the significant effect of tone on vowel duration in the RM-ANOVA should not be considered as an indication that vowel duration is an acoustic correlate of the lexical tone contrast under investigation. Instead, it is an artifact, caused by a variety of factors: (a) the fact that the data set was not balanced for syllable structure; (b) the epenthetic final /o/ on words with the Low Fall toneme; (c) the large size of the data set.

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[56] Phonemically, /ya^{21}w/ ‘seed’ has a VC rhyme. In the acoustic analysis, the sequence /aw/ has been treated as a diphthong vowel, so as to avoid the problem of segmenting this sequence.

Table V.3: LDA results – correct classification of tones on the basis of a number of postdictors (both single and combined). To be interpreted relative to a 16.6 percent chance-level baseline.

Acoustic measure(s)	**Correct classification result**
Duration of vowel	22.9
F_0 mean	52.6
F_0 standard deviation	51.2
F_0 at vowel onset	54.5
F_0 end value	43.2
F_0 maximum	60.1
F_0 slope	67.7
Timing of maximum	54.2
Best result with two postdictors: f_0 slope & f_0 mean	85.6
Best result with three-postdictors: f_0 at vowel onset & f_0 slope & f_0 mean	88.7

By including several f_0-related measures simultaneously in the LDA, the discrimination result can be increased to between 85 and 90 percent correct classification. With three acoustic measures as postdictors, the best correct classification result stands at 88.7 percent. The confusion matrix of this LDA (see Table V.4) reveals that it is specifically the Rise-Fall allotone of the Low Fall toneme that is incorrectly classified, most often as a Low Rise or as a High Level. None of the measures sets it apart from the other tones: inspection of the descriptive statistics (Appendix E, Table 11) reveals that for most measures, it is the average value of the Rise Fall that lies closest to the mean over all tones. Also, it appears to vary considerably as a function of utterance context (see Figs. V.3A,B). Interestingly, the Rise-Fall is rarely confused with the Low Fall, the other allotone of the Fall toneme, or vice-versa. Evidently, there is no confusion between the two allotones of the Fall in acoustic terms.

Table V.4: Confusion matrix for LDA with postdictors f_0 at vowel onset, f_0 slope, and f_0 mean. Classification expressed as a % of original; absolute numbers between parentheses in totals column. Correct classification along diagonal.

Classified as → Actual ↓	**E. High Fall**	**High Level**	**Low Rise**	**Low Level**	**Rise Fall**	**Low Fall**	**Total**
E. High Fall	97.2	1.4	.0	.0	.0	1.4	100 (285)
High Level	.0	90.3	2.2	.0	7.5	.0	100 (279)
Low Rise	.0	3.6	93.3	2.4	.6	.0	100 (329)
Low Level	.0	.0	.0	97.9	.4	1.8	100 (282)
Rise-Fall	.0	32.3	21.8	7.3	33.9	4.8	100 (124)
Low Fall	1.6	4.9	.0	5.4	.0	88.1	100 (185)

5.3.3.2. The effect of utterance context on f_0 and duration

Many languages feature utterance-final lengthening, a phenomenon whereby the last rhyme of a word has a relatively longer duration in utterance-final position (Vaissière 1983, Maddieson 1997, Cambier-Langeveld 2000). Final lengthening does occur in Matbat: while average vowel duration in sentence-final position stands at 233 ms, it is only 145 ms sentence-medially. This effect of utterance context on vowel duration is significant [F (1,7) = 198.0, $p < 0.01$].

Utterance context also affects f_0. On average, all tones have lower f_0 in the utterance-final context [e.g. f_0 mean: F (1,7) = 88.3, $p< 0.01$; f_0 end value: F (1,7) = 56.8, $p< 0.01$]. However, the significant interactions between factors utterance context and tone [f_0 mean: F (5,35) = 8.6, $p < 0.01$; f_0 end value: F (5,35) = 24.45, $p< 0.01$] suggest that the effect is not present for all tonemes.

In fact, the effect of utterance context on tonal realization in Matbat (see Figures V.3A,B) is similar to that of the presence or absence of a voiced coda (see Figures V.2A,B). Like a voiced coda, an utterance-final position has the falling tones falling lower. Alternatively, this effect could be attributed to intonation: we could hypothesize that the tones that end in a low target are followed by a low boundary tone (L% in autosegmental terms). However, the sentence-final lowering is not present for all tones that end in a low target. In a RM-ANOVA based solely on items with the Low level toneme, sentence context has no significant effect on the f_0 end value [F (1,7) = 5.55, n.s.]. Separate RM-ANOVAs based on items with the Extra High Fall, the Rise Fall and the Low Fall, on the other hand, do show significant effects of sentence context on f_0 end value.[57] It makes sense that the Low level toneme does not end lower in sentence-final context, because then the contrast with the Low Fall would be reduced. The absence of final lowering in this toneme therefore confirms the phonological description of this toneme as level: its level nature is well maintained over contexts.

[57] Extra High Fall: F(1,7) = 62.2; Rise Fall: F (1,7) = 25.8; Low Fall: F (1,7) = 48.6 – all three $p<0.01$.

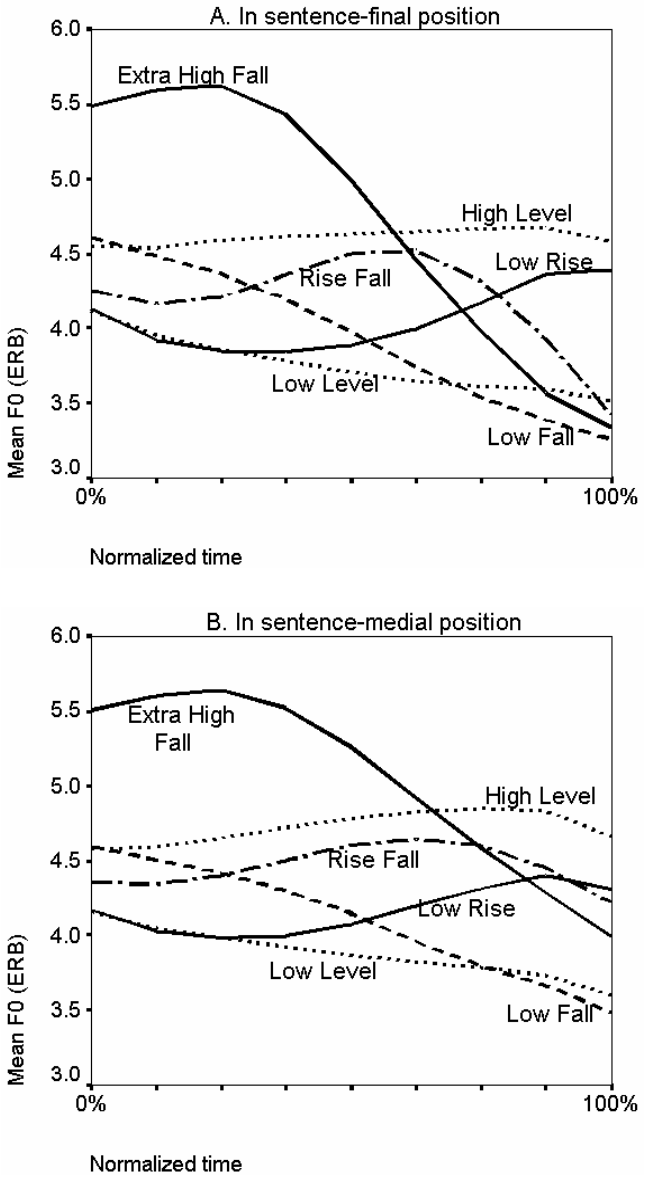

Figure V.3: F_0-tracks of the 6 tones on the voiced part of the rhyme of monosyllabic words. Target words in sentence-final (A), and in sentence-medial (B) position. The tracks are represented on a normalized time axis, and plotted against an ERB scale.

Instead of interpreting the lowering of falling tones in utterance-final context as a matter of interaction of tone with intonation, I interpret it along the same lines as the

similar phenomenon found for words with a voiced coda. Like words with a voiced coda, words in utterance-final position are realized more fully because there is more segmental material to encode the f_0 pattern of the tone on. While the contour tones reach more extreme values (the falling tones lower, the rising tone higher), nothing much happens for the level tones. In this way, utterance-final lengthening has different consequences for tonal realization of the contour tones as compared to the level tones.

5.4. Conclusion and discussion

5.4.1. Conclusion: Matbat is a tone language with five tonemes

According to the hypothesis presented here, Matbat features a lexical tone system with five tonemes, one of which has two allotones. This hypothesis was supported by minimal pair evidence and by an acoustic analysis of the hypothesized tonal contrast. On the basis of this compelling evidence, it can be concluded that Matbat has a lexical tone system with five tonemes. This makes Matbat the second RASH language of the Raja Ampat archipelago to feature lexical tone, next to Maˈya (van der Leeden 1993; Chapters II, III).

Of all tones, only the Rise-Fall allotone of the Fall toneme appears to be unstable, both phonologically and in terms of acoustic encoding. First, at least some monosyllabic words that have this toneme are also realized with the Low Fall, the other allotone of the Fall toneme. Second, the acoustic encoding of the Rise Fall does not distinguish it well from the Low Rise and High tonemes. As mentioned above, the Matbat Low Fall, the other allotone of the Fall, is similar to the Maˈya Fall both in acoustic form and in the fact that it takes an epenthetic final /o/. This suggests that Matbat borrowed this toneme from Maˈya. It appears to be the case, therefore, that the Matbat Fall toneme is in the middle of a diachronic change from a rise-fall contour to a fall contour, under the influence of the Maˈya Fall toneme.

5.4.2. Discussion: Tonogenesis in Matbat and Maˈya was contact-induced

Apart from Matbat and Maˈya, there are 13 Austronesian languages that have been reported to feature lexical tone:

- The Chamic languages Eastern Cham (Edmondson & Gregerson 1993) and Utsat (Maddieson & Pang 1993)
- Mor, a SHWNG language from Cendrawasih Bay (Laycock 1978)
- Kara, Barok and Patpatar (Sokirik dialect only), all in New Ireland (Hajek 1995)
- The North Huon Gulf languages Yabem and Bukawa (Ross 1993)
- Five languages of New Caledonia (Rivierre 1993)

While most of these languages have a two-tone contrast, three-tone systems have been reported for Eastern Cham and Cémuhî, one of the New Caledonia languages. A conspicuous exception, however, is Utsat, which has five lexically contrastive tonemes. Utsat is used by a small community of only two villages on Hainan island, which are surrounded by a population speaking a Chinese tone language (Maddieson & Pang 1993). The comparative anomaly of Utsat's complex tone system makes sense when we take into account this context of language contact. The tone languages of North Huon Gulf and of New Caledonia, on the other hand, have been interpreted as instantiations of spontaneous tonogenesis (Rivierre 1993, Ross 1993). Evidently, while spontaneous tonogenesis has led to tone systems with two and in one case three tonemes, the more complex system of Utsat has developed in a situation where language context induced tonogenesis.

Similarly, I hypothesize that tonogenesis in Matbat was triggered by a non-Austronesian language with which Matbat was in contact. Different from Utsat, however, this non-Austronesian language does no longer exist.

Various types of tonal phenomena, including complex lexical tone systems, have been reported for the non-Austronesian (Papuan) languages of New Guinea (Donohue 1997). However, there is currently no Papuan tone language on Misool, or anywhere else in the Raja Ampat archipelago. The closest non-Austronesian language is Moi, which is used on the New Guinea mainland and on the eastern coast of Salawati island – Moi has not been reported to feature lexical tone (Menick 1995). In any case, postulating language contact between Matbat and any language outside Misool is highly speculative reasoning, because the Matbat people used to inhabit the interior of Misool until recently (Wallace 1869; see Appendix C). Instead, I hypothesize that the Papuan tone language from which lexical tone in Matbat originated, was the Papuan substrate language that was used on Misool before the arrival of the Austronesians in the area. Rather than being a product of tonogenesis, lexical tone in Matbat is a feature conserved from its pre-Austronesian past. In a language contact situation, it is not uncommon for prosodic features of substrate language X to be retained in a vocabulary drawn predominantly from dominant language Y. In this way, Papiamentu, a creole language of the Caribbean with a predominantly Spanish and/or Portuguese vocabulary, has retained a tonal contrast from its West African heritage (see § III.1.2.2). Similarly, the Scots dialect of the Shetland islands (north of Scotland) has a segment duration pattern that is characteristic for Norse: in stressed closed monosyllabic words, long vowels are followed by a short consonant and short vowels by a long consonant (van Leyden, to appear). Van Leyden attributes this phenomenon to the Norse substrate of Shetland Scots.

Moreover, evidence of the non-Austronesian substrate language of Matbat is not limited to its word prosodic system; it is also apparent from the vocabulary. The Matbat Swadesh list in Appendix A suggests that a considerable proportion of the lexicon of Matbat has not been derived from an Austronesian ancestor. Although all SHWNG languages feature non-Austronesian lexical items, the phenomenon is clearest for Matbat and Ambel (see Chapter II and Appendix A), both languages of

interior-oriented groups. Like its tonal contrast, the considerable proportion of non-Austronesian items in the Matbat lexicon can be accounted for most easily by attributing it to the non-Austronesian substrate language.

For Matbat, the substrate hypothesis is undoubtedly the most likely scenario for tonogenesis. For tonogenesis in Maʲya, on the other hand, there is an alternative hypothesis. There is clear evidence that the Maʲya villages of the Raja Ampat archipelago played an important part in the slave trade between west New Guinea and the Moluccas, and that there frequently were slaves in *raja* villages such as Samate (see Appendix C). This history of slavery offers a potential explanation for the origin of lexical tone in Maʲya (just as it does for Papiamentu). It is therefore possible that Maʲya developed lexical tone through contact with the Papuan tone languages of slaves. However, this alternative hypothesis has clear weaknesses. First, the tone system of Maʲya is very similar across the Misool, Salawati and Laganyan dialects. This strong similarity suggests that the Maʲya lexical tone system developed before the dialect split, which predates the historical record and is part of Maʲya mythology. If tonogenesis would have taken place through language contact induced by the slave trade after the dialect split, then the Misool dialect would have different tones from the Salawati dialect, because both groups were hunting/buying slaves in different areas of New Guinea (see Appendix C). Although it is not impossible that the slave trade predates the migration of the Maʲya, this is highly speculative. Second, only two of the Papuan languages of the Bird's Head, the area of origin of most slaves, are tonal. Abun has a three-way tone contrast with a low functional load (C. Berry 1998, K. Berry p.c.), and Mpur has a three, four or five tone contrast with high functional load (Odé 1998). Both are located in the northern part of the Bird's Head, well out of reach of the Maʲya slave-hunters from Misool. The Papuan language closest to the RA islands, Moi, is not a tone language (Menick 1995). Finally, if the case of Matbat allows us to safely assume that a tone language was used on Misool before the arrival of the Austronesians, then this increases the likelihood of another – probably related – tone language being used elsewhere in the Raja Ampat archipelago. Interestingly, all three of the Maʲya tones are acoustically similar to Matbat tones: both languages have a high level toneme, a low rise, and a low fall.

The most likely explanation for tonogenesis in Maʲya, therefore, is that the non-Austronesian substrate language that was used on Waigeo before the arrival of the Austronesians featured lexical tone contrasts. When speakers of this language came in contact with and assimilated Austronesian Proto-SHWNG, they retained the tone contrast of the substrate language. Parsimoniously, the same hypothesis accounts for tonogenesis in Matbat.

6 A diachronic perspective on Maˈya word prosody

6.1. About this chapter

This chapter focuses on the historical development of the word prosodic system of Maˈya. In § III.1.2.2, it has been noted that hybrid word prosodic systems like that of Maˈya are extremely rare. In fact, no other language has been reported to feature both lexical tone and lexically contrastive stress. It is therefore worthwhile examining the diachronic phonological processes that have led to this system.

The chapter begins with a discussion of the word prosodic patterns of the Maˈya dialects of Misool, Salawati and Waigeo (§ VI.2). This discussion reveals that lexical stress, lexical tone and the distribution of vowels are constrained by one another in Maˈya. Section VI.3 then presents a number of historical developments in the phonological form of Maˈya words, which are crucial to an understanding of how Maˈya word prosodic system came into being. These developments explain how stress, tone and vowel structure came to be linked the ways they are, and they make clear how Maˈya developed both lexical tone and contrastive lexical stress. On the basis of these findings, § VI.4 presents a hypothesis on how the Maˈya word prosodic system came into existence.

6.2. Maˈya word prosodic patterns: the facts

6.2.1. Salawati Maˈya

Maˈya has three lexically contrastive tonemes: a High, Rise and Fall. The last of these tonemes functions as a default, and can be interpreted phonologically as lexical stress. The tonemes on monosyllabic words, and their acoustical realization, have been discussed at length in Chapters III and IV.

Table VI.1 lists examples of the word prosodic patterns of polysyllabic content words in Maˈya. Various factors appear to be correlated with the location of lexical stress in polysyllabic words of the native vocabulary of Maˈya:

- Words with final stress have either the High or the Rise toneme, if any, on the final syllable. Words with penultimate stress only have either the High toneme or no toneme on the final syllable.
- All polysyllabic words with stress on the final syllable have the vowel /a/ in the penultimate syllable.
- Most words with penultimate stress have the same vowel in the penultimate and in the final syllable. This tendency is not without exceptions, e.g. /ˈpina^{3}/ and /ˈpali^{3}/, but these cases are rare.

Table VI.1: Word prosodic patterns in Salawati Maʲya. Examples from van der Leeden (1993, ms. 1) and from Appendix A.

Number of syllables	**Penultimate stress**	**Final stress**
2-syllabic	ˈmoro^{3} ‘wind’	paˈle^{3} ‘big’
	ˈara(o) ‘tong’	kaˈyu(o) ‘tail’
	ˈsiri(o) ‘juice’	saˈgul(o) ‘nose’
	ˈtala^{3} ‘banana’	taˈla^{3} ‘k.o. plant’
	ˈpina^{3} ‘widow’	maˈme^{3} ‘red’
	ˈpali^{3} ‘ritual song’	paˈlyu^{3} ‘pea, bean’
	ˈpisi^{3} ‘to hurt’	kaˈi^{3} ‘grass’
	ˈwene^{3}f ‘to sleep’	panˈpo^{12}n ‘food’
	ˈsolo^{3}n ‘sit’	saˈlyo^{12}n ‘k.o. fish’
	ˈmete^{3}n ‘dry’	wa-ˈsya^{3}l ‘say’
	ˈlomo^{3}s ‘blood’	kaˈu^{3}t (weda uto)
3-syllabic	kaˈmini^{3}s ‘yellow’	wakaˈlyo^{3} ‘lie down’
	matˈmete^{3}m ‘black’	waraˈle^{3} ‘a fly’
	masˈmasa^{3} ‘sweat’	galaˈwa^{12} ‘new’
	maˈtumol(o) ‘people’	garaˈto^{12}l ‘worm’
4-syllabic (rare)	kalaˈbyobo^{3}n ‘butterfly’	

A schematic representation of lexical stress in Salawati Maˈya, and its relation to tone and the distribution of vowels is given in Figure VI.1. There are a number of correlations between these three features. First, vowel structure is linked with lexical stress in two ways:

I. If a polysyllabic word has a vowel other than /a/ in the penultimate syllable, it can only have penultimate stress. Alternatively, when a polysyllabic word has the vowel /a/ in the penultimate syllable, then stress is contrastive, either on the penultimate or on the final syllable.

II. If a polysyllabic word has a vowel other than /a/ in the penultimate syllable, the vowels of penultimate and final syllables are usually the same.

Second, lexical stress is correlated with lexical tone:

III. Words with penultimate stress can only have a High toneme; words with final stress can have either the High or the Rise tonemes.

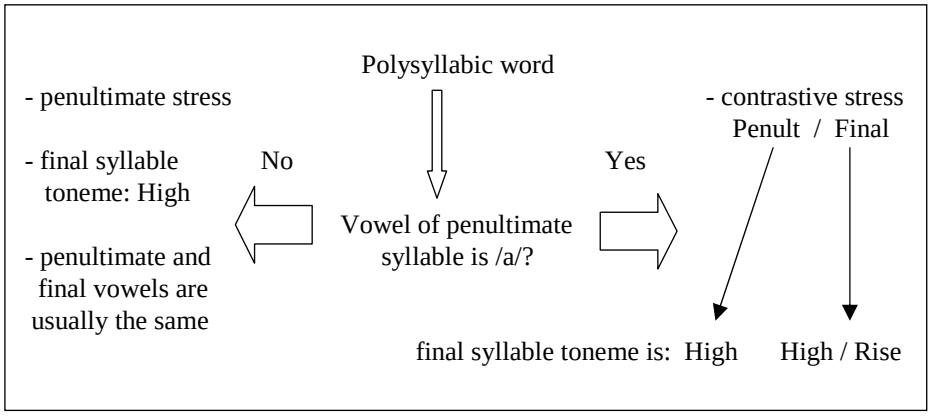

Figure VI.1: Schematic representation of factors correlated with the distribution of lexical stress in Salawati Maʸya.

Many loan words violate these constraints, keeping the stress pattern and vowel structure of the word in the language from which it is borrowed. This is illustrated by the examples in Table VI.2. The word /ˈmoka^{3}/, for example, has penultimate stress like its Dutch source, but violates the tendency of Maˈya words of having the same vowels in the penultimate and final syllables of words with penultimate stress. Similarly, /soˈpo^{3}/ 'to be gilded' has final stress like its Malay source /seˈpuh/, but violates the Maˈya tendency of words with final stress to have the vowel /a/ in the penultimate syllable.

Table VI.2: Some loan words in Maʸya 'M.' stands for Malay, 'D.' for Dutch.

Penultimate stress		**Final stress**	
Maˈya	**Source language**	**Maˈya**	**Source language**
ˈdesa^{3}	M. ˈdesa 'village'	taˈba^{12}k	D. taˈbak 'tobacco'
ˈmoka^{3}	D. ˈmoka 'k.o. coffee'	kanˈto^{3}r	D. kanˈto:r 'office'
ˈnelo^{3}ŋ	D. & M. 'nylon' (penult. stress in both languages)	karˈta^{12}s	M. kerˈtas 'paper'[58]

There are also a number of words that have not been borrowed faithfully. Interestingly, the changes in lexical stress and vowels make these words conform to

[58] Maˈya has a five vowel system without schwa /i,e,a,o,u/. /a/ appears to be the unmarked vowel.

the constraints observed for original Maˈya words. For example, /wakˈtu^{3}/ ‘time’ has final stress, while its Malay source has /ˈwaktu/.[59] By this stress shift to the final syllable, this word obeys the constraint that words with the vowel /a/ in the penultimate syllable and another vowel in the final syllable have final stress.

In a number of loan words, on the other hand, the stress pattern of the source has been retained, but the vowels have been changed in such a way that the words respect the above-mentioned constraints. For example, /ˈgulu^{3}/ ‘sugar’ < Malay /ˈgula/ (same meaning). Similarly /ˈkuru^{3}ŋ/ ‘not enough’, /ˈmuru^{3}/ ‘cheap’, /ˈsusu^{3}/ ‘difficult’, /ˈrupu^{3}/ ‘form’ are derived from Malay /ˈkuraŋ/, /ˈmura/, /ˈsusa/, /ˈrupa/, respectively (van der Leeden 1993:44). In all these words, the final vowel has been changed to /u/, and the resulting form complies with the constraint that words with penultimate stress have the same vowels in the penultimate and final syllables of the word. Also, /kamˈfo^{3}r/ is an adaptation of Malay /kompor/ or Dutch /komˈfo:r/, with the initial /o/ changed to /a/, similar to original Maˈya words with final stress.

The changes in loan words that have not been borrowed faithfully demonstrate that the constraints distinguished for the non-borrowed vocabulary of Maˈya are real. That is, the regularities that are evident from the examples in Table 1, are representative for the Maˈya vocabulary as a whole. In § VI.3 a number of phonological processes will be presented that explain how these constraints came into being. Before that we will examine the word prosodic patterns of the Misool and Waigeo dialects.

6.2.2. Misool Maˈya

The word prosodic patterns of Misool Maˈya are very similar to those of the Salawati dialect. The only difference is the following. While in Salawati Maˈya words with penultimate stress have a High toneme on the final syllable, in Misool Maˈya these words have the Rising toneme on the final syllable. Table VI.3 lists a number of examples illustrating this difference between Salawati and Misool dialects. Exceptions – such as Misool Maˈya /kameˈnini^{3}s/ ‘yellow’ – are very rare.

Figure VI.2 gives a schematic representation of the relation between lexical stress, lexical tone and vowel distribution in Misool Maˈya. The relations between these factors are the same as in the Salawati dialect, apart from the toneme on the final syllable of words featuring penultimate stress. While such words have a High toneme in the Salawati dialect, they have the Rise toneme in the Misool dialect.

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[59] The most likely source of Malay loan words in Maˈya is a regional dialect of Malay rather than the national standard. Unlike Standard Indonesian (Goedemans & van Zanten, to appear), the Malay dialects of eastern Indonesia do feature lexical stress, mostly on the penultimate syllable (Steinhauer 1983, van Minde 1997).

Table VI.3: The difference between the word prosodic systems of the Salawati and Misool dialects of Maʲya. Examples from van der Leeden (1993, ms. 1) and from Appendix A.

Number of syllables	Misool Ma'ya	Salawati Ma'ya	English
2-syllabic	'moro^{12}	'moro^{3}	wind
	'wene^{12}f	'wene^{3}f	sleep
	'lili^{12}n	'lili^{3}n	road
	'lasa^{12}n	'lasa^{3}n	sun
	'solo^{12}n	'solo^{3}n	to sit
	'bini^{12}s	'bini^{3}s	hot
	'tala^{12}	'tala^{3}	banana
	'waya^{12}	'waya^{3}	water
3-syllabic	kame'nini^{3}s	ka'mini^{3}s	yellow
	mat'mete^{12}m	mat'mete^{3}m	black
	mas'masa^{12}	mas'masa^{3}	sweat

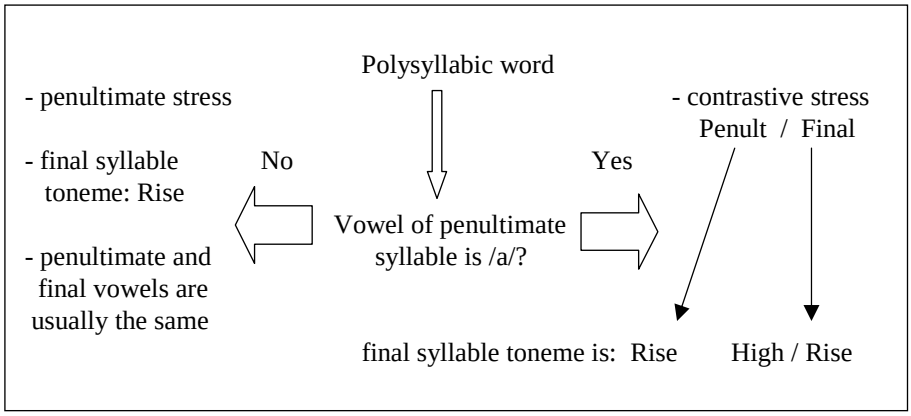

Figure VI.2: Schematic representation of factors correlated with the distribution of lexical stress in Misool Maʲya.

6.2.3. Waigeo Ma'ya (all dialects)

The Waigeo dialects of Ma'ya are Kawe, Wauyai and Laganyan (see Chapter II). While Laganyan has lexical tone, Kawe and Wauyai do not. In terms of lexical stress and vowel distribution, on the other hand, there is not much difference between the three dialects. Also, there is a phenomenon that sets apart each of the

Waigeo dialects from the Salawati dialect. Just as in the Misool dialect, this difference has to do with words that have penultimate stress.

In the Waigeo dialects, if such words have the same vowel in penultimate and final syllables, and end in an open syllable, the final syllable vowel is apocopated when the word appears in sentence-medial context. In other words, the final vowel is only realized when the word appears in sentence-final position. Examples are listed in Table VI.4. This phenomenon only affects words with an open final syllable.

Table VI.4: Comparison of word forms in the Salawati dialect, the Misool dialect, and the three Waigeo dialects. Words of Waigeo dialects are not marked for word prosody, because the three Waigeo dialects vary among themselves in this respect. Square brackets around a vowel indicate that this vowel is realized in sentence-final position, but not in sentence-medial position (apocope).

	Salawati	**Misool**	**Waigeo (all)**	**English**
CVCV	ˈmini^{3}	ˈmini^{12}	min[i]	bird
	ˈtala^{3}	ˈtala^{12}	tal[a]	banana
	ˈmoro^{3}	ˈmoro^{12}	mor[o]	wind
	ˈlolo^{3}	ˈlolo^{12}	lol[o]	storm
	ˈwaya^{3}	ˈwaya^{12}	way[a]	water
	ˈmana^{3}	ˈmana^{12}	man[a]	light
CVCVC	ˈwene^{3}f	ˈwene^{12}f	ˈwenef	sleep
	ˈlili^{3}n	ˈlili^{12}n	ˈlilin	road
	ˈlasa^{3}n	ˈlasa^{12}n	ˈlasan	sun
	ˈsolo^{3}n	ˈsolo^{12}n	ˈsolon	sit
	ˈbini^{3}s	ˈbini^{12}s	ˈbinis	hot

6.2.4. Summary

The overview of word prosodic patterns of the various Maˈya dialects has revealed that lexical stress, lexical tone and the distribution of vowels are constrained by one another in Maˈya. This interpretation of the data is supported by evidence from loan words, some of which have been modified so that they obey these constraints. Between the various dialects, there is considerable variation between words with penultimate stress. These words carry a High toneme on the final syllable in the Salawati dialect, a Rise in the Misool dialect, and in the Waigeo dialects they lose open-syllable vowels in sentence-medial context. In the next section we will look at the historical processes that brought about the constraints observed above.

6.3. Phonological processes in the history of Maˈya

In order to understand how the unusually constrained word-prosodic system of Maˈya came into existence, we have to examine the historical processes that were crucial in creating it.

6.3.1. Syllable deletion (in Proto-SHWNG)

In the landmark paper that established the position of the South Halmahera-West New Guinea subgroup within the Austronesian language family, Blust (1978) lists a number of sound changes that have occurred in all SHWNG languages. Important from the perspective of word prosody are the processes that result in the deletion of syllables. While the Proto-Austronesian vocabulary was predominantly disyllabic (Ross 1995:95), many of these words are reflected as monosyllabic in SHWNG languages. Blust (1978:192) distinguishes apocope and syncope processes, which have occurred in all languages of the Raja Ampat-South Halmahera (RASH) branch of SHWNG, and in several of the West New Guinea branch:[60]

1. Apocope – deletion of vowels in word-final position. The effects of this sound change are very clear in the vocabulary of Maˈya The final syllable may have been light (CV) in the first place:

*telu > My /ˈto^{3}l/, Gn, Tb /tol/ ‘three’
*penu > My /ˈfe^{3}n/, Bl Gn /fen/ ‘sea turtle’
*lima > My /ˈli^{3}m/, Gn, Tb /lim/ ‘five’
*banua > My /ˈpnu^{3}/, Bl /pnu/ ‘village’
*DuSa > My /ˈlu^{3}/, Gn /-lu/ ‘two’
*pia > My /ˈfi^{3}/, Tb /hia/ ‘good’
*Rambia > My /ˈbi^{3}/ ‘sago’
*walu > My /ˈwa^{3}l/ ‘eight’
*sapu > My /ˈsa^{12}/ ‘to broom’
*batu > My /kaˈpa^{12}t/, Bl /pat/ ‘stone’

[60] Abbreviations and sources of the examples: Sawai [Sw] (Whisler & Whisler 1994), Buli [Bl] (Maan 1940), Taba [Tb] (Collins 1982, Bowden 1997), Biak [Bk], Ron [Rn], Dusner [Ds], Waropen [Wr], Windesi [Wd] (Blust 1978, Smits & Voorhoeve 1992); Mor (Laycock 1978). Minyaifuin [Mn], As (Smits & Voorhoeve 1992); Ambel [Am] Biga [Bg], Matbat [Mb] from Appendix A and from Smits & Voorhoeve (1992). Maˈya [My] (Salawati dialect unless indicated otherwise) from Appendix A and from van der Leeden’s Maˈya dictionary (ms. 1). Proto-Austronesian, [PAN], Proto-Malayo-Polynesian [PMP], Proto-Eastern Malayo-Polynesian [PEMP], Proto-Oceanic [POC] (Blust 1978, 1985, ms.; Zorc 1995).

Alternatively, the final vowel may have been followed by a semivowel (or formed a diphthong with it), in which case both the vowel and the semivowel are lost:[61]

*pajay > My /ˈfa^{12}s/, Rn, Wn /fas/ ‘rice’
*qenay > My /ˈle^{12}n/, Bl /nyinyen/ ‘sand’
*Sapuy > Maˈya /ˈla^{12}p/, Bl /yap/ ‘fire’
*maCey > My /ˈma^{12}t/, Bl /mat/ ‘to die’
*sakay > My /ˈsa^{3}/ ‘to rise’
*beRay > My /ˈbe(o)/ ‘to give’
*qanahaw > My /ˈna^{3}/ ‘k.o. palm tree [Arenga pinnata]’

A number of words that were affected by the apocope process, have a coda consonant in PAN, where they end in one of the following consonants: *q,ʔ,H,S,x,j,R,ŋ (Blust 1978:192). These consonants merged with zero in Proto-SHWNG, so that the final syllable vowel became visible for apocope. Here are some examples:

*q	*bunuq	> My /ˈbu^{3}n/, Bl /pun/, Bk /mun/ ‘kill’
	*salaq	> My /ˈsa^{3}l/, Tb Gn /-col/ ‘error’
	*penuq	> My /ˈfo^{12}n/ ‘full’
	*Rumaq	> My /ˈu^{3}m/, Bg, Mn, As /um/, Bk, Rn, Ds /rum/ ‘house’
	*babaq	> My /ˈpa^{12}p/ ‘lower, low’
	*panaq	> My /ˈfa^{12}n/ ‘to shoot with bow and arrow’
*h	*saŋah	> My /kaˈʃa^{12}n/ ‘branch’
	*kuCuh	> My /ˈu^{3}t/, Am, Ds, Mn /ut/ ‘louse’
	*Cinaqih	> My /ˈna^{12}/, Bl /hnyao/ ‘belly’
	*babinahi	> My /ˈpi^{3}n/ ‘woman’
*S	*paRiS	> My /ˈfa^{3}/, Sw /fa/ ‘stingray’
*R	*deŋeR	> My /ˈdo^{12}n/, Gn /loŋa/, Bl /loŋa/, Tb /-loŋa/ ‘to hear’
	*qateluR	> My /ˈto^{12}l/, Tb /tolo/ ‘egg’
	*bihaR	> My /waˈbi^{12}/ ‘ to be alive’
*ŋ	*waŋkaŋ	> My /ˈwa^{12}k/, Bk /way/, Mn /wag/ ‘canoe’

In Maˈya, apocope also took place in a number of words which did not end in *q,ʔ,H,S,x,j,R,ŋ in PAN:

*asep > My /ˈla^{12}s/, Bl /mamayas/, Sw /mɛyas/, Tb /yaso/ ‘smoke’
*lipen > My /kaˈli^{3}f/ ‘tooth’
*budan > My /ˈbu^{3}s/, Tb /bulaŋ/, POC *pulan ‘white’

2. Syncope – a non-final vowel is deleted. In some cases the rest of the syllable is deleted with it. Some cases of syncope involve deletion of the antepenultimate vowel. Others involve deletion of the penultimate vowel, which is always preceded by a nasal. This has led Bowden (1997) to label it post-nasal syncope. Examples are

[61] An exception is /ˈlati^{3}/ ‘liver, which derives from *qatay. Here we find, instead of apocope, a final vowel shift from /a/ to /i/. This is a relatively rare sound change among SH lamguages, signalled in Blust (1978).

listed below. Post-nasal syncope did not take place in all words with a nasal onset in the penultimate syllable – it did not apply in e.g. My /ˈmini^{3}/ < *manuk 'bird'.

*banua > My /ˈpnu^{3}/, Bl /pnu/ 'village'
*Rambia > My /ˈbi^{3}/ 'sago'
*Cinaqih > My /ˈna^{12}/ 'stomach'
*qanahaw > My /ˈna^{3}/ 'k.o. palm tree [Arenga pinnata]'
PEMP *natu > My /kaˈʃu^{3} ~ kaˈcu^{3}/, Bl /ntu/, POC *natu, Wr /ku/ 'child'
*niur > My /ˈnu^{3}/, Gn, Tb /niwi/ 'coconut'
*maCa > My /ˈta^{12}/, Bl /mta/, Bk /mga/ 'eye'

The syncope and apocope processes discussed above result in the deletion of syllables. Whereas stressed syllables are not prone to deletion, unstressed syllables are, and therefore the syncope and apocope processes shed light on stress assignment in Proto-SHWNG. In the development of Proto-SHWNG, these syllable-deleting processes deleted final and antepenultimate syllables, but did not affect penultimate syllables. This suggests that Proto-SHWNG had penultimate stress. Exceptional in this respect are a small number of words in which the penultimate syllable has a nasal onset: *maCa, *natu, *niur. In these words it was the vowel of the penultimate syllable that was syncopated. It is unclear how these exceptions can be accomodated: why would a few words with a nasal onset have an exceptional stress pattern?

It is also noteworthy that the toneme patterns of Maˈya words do not appear to be predictable from the segmental structure of the Proto-SHWNG root of which the Maˈya word evolved. We will come back to this in § VI.4.2.

6.3.2. Vowel assimilation (in Maˈya)

It was mentioned above that Proto-SHWNG apocopated final vowels that were followed by *q,ʔ,H,S,x,j,R,ŋ in PAN (Blust 1978). Another PAN consonant lost by Proto-SHWNG is *k. Blust (1978) argued that the merger rule of PAN *k with zero spread westward from the Cendrawasih Bay area, and was active in the RASH languages after the final apocope process had ceased to be productive. Compelling support for this hypothesis comes from the fact that while most RASH languages have lost the PAN *k, the ones furthest west have not (Blust 1978:204). So while *manuk is reflected as /man/ in Biak, where the *k deletion took place at a time when final apocope was still productive, it is reflected as /mani/ in Buli (Maan 1940) and as /manik/ in Gane (Teljeur 1982).

In Maˈya, such words with an open final syllable underwent a vowel assimilation process. This process was also productive in words that were polysyllabic because they had not lost their final coda in the first place, and had therefore kept the final vowel.

This vowel assimilation process is not directional in a regular way: in some words it is the PAN first syllable vowel that was copied in the second syllable; in other lexical items the process took place in the opposite direction. Examples are listed

below, both from PAN reflexes and other lexical items shared with other RASH languages:

Progressive vowel assimilation:

*belembaŋ > My /kalaˈbyobo^{3}n/, Bl /aiboban/, Sw /kalɛbobɛn/ ‘butterfly’
*tu(n)daŋ > My /ˈsolo^{3}n/, Bl /totolaŋ/, Sw /-tolɛn/ ‘sit’
SHWNG *onem > My /ˈwono^{3}m/, Bl wonam, Sw /-wɔnɛm/ ‘six’

*inum > My /w-ˈini^{3}m/, Sw /-inɛm/, Mr /anumi/ ‘to drink’
? > My /w-ˈoso^{3}l/, Buli /osal/, Sw /-osɛl/ ‘stand’
*pejes > My /ˈpisi^{3}/, Sw /-pisɛ/ ‘to hurt’
? > My /ˈmoro^{3}/, Sawai /morɛ/, Tb /moda/ ‘wind’
*k *beRek > My /ˈbo^{3}/ (via /boe/ - see note on /ˈlolo^{3}/) ‘pig’
*hutek > My /kaˈu^{3}t ~ ka-ˈutu^{3}/, Sw (Weda dialect) /uto/ ‘head’
*delek > My /ˈlolo^{3}/[62] ‘thunder’
*Rebek > My /w-ˈopo^{3}/, Bl /opa/, Bk /rob/ ‘to fly’

Regressive vowel assimilation:

*ma-qitem > My /matˈmete^{3}m/ ‘black’
*qinep > My /w-ˈene^{3}f/ Sw /-yɛnɛf/ ‘to sleep’
*ma-qasin > My /ˈlisi^{3}n/, Tb yasi/ ‘salt’
? > My /ˈtala^{3}/, Bl /tela/ ‘banana’
*ma-panas > My /ˈbini^{3}s/, Sw /-mafyanɛs/, ‘hot’
*Zalan > My /ˈlili^{3}n/, Bl /laliŋ/ ‘path’
*k *manuk > My /ˈmini^{3}/, Bl /mani/, Sw /manɛ/ ‘bird’

The above examples suggest a constraint in Maˈya that the last two vowels of a word stem be identical. This constraint is also evident from the suffix that marks agreement with the possessor on inalienable body parts and kinship terms. This vowel is the same as that of the preceding syllable, the final syllable of the stem. Table VI.5 illustrates this morphological paradigm. Similarly, /saˈgul(-o)/ ‘nose-3sg.’ has 1st sg. /saˈgul-u^{3}k/ and /gal(-o)/ ‘mouth-3sg.’ has 1st sg. /ˈgala^{3}k/. It is unclear how the vowel in this suffix should be analyzed. A word like /kaˈut(-o)/ is a reflex of PAN *hutek, and the /u/ in the suffix could be interpreted as a result of progressive vowel assimilation of the final vowel of the PAN root, just like in the examples above. The words /saˈgul(-o)/ and /gal(-o)/, on the other hand, are not reflexes of PAN roots, so that we do not know whether the vowel of the suffix is the remnant of an assimilated vowel of the stem, or a paragoge vowel which copies the final vowel of the stem in its current form.

[62] Via *lole. Vowel shift from *e to /o/ in penultimate syllable is regular in SHWNG languages (Blust 1978:192). See also, for example, reflexes of *penuq, *deŋer and *Rebek.

Table VI.5: The morphological paradigm of agreement with the possessor on inalienable body parts and kinship terms, as illustrated by /kaˈut(o)/ 'head'.

	/kaˈut(-o)/ 'head'
1 sg.	kaˈut-u^{3}k
2 sg.	kaˈut-u^{3}m
3 sg.	kaˈut(-o)
1 pl. inc.	kaˈut-un
1 pl. exc.	kaˈut-um
2 pl.	kaˈut-um
3 pl.	kaˈut-un(-o)

Similarly, in the following Maˈya words the final vowel could have resulted from a vowel copy process rather than from vowel assimilation. As /R/ merges with zero in Proto-SHWNG, we would expect these words to be monosyllabic, because the final syllable vowel is subsequently deleted (see § VI.3.1). It is therefore not unlikely that final syllable vowels are the product of phonological copying.

*qateluR > My (Misool) /ˈtolo^{12}/ 'turtle egg'
*wahiR > My /ˈwaya^{3}/ 'water'

The overview of the word prosodic systems of Maˈya dialects in § VI.2 made clear that all three Maˈya dialects show evidence of this vowel assimilation process. Interestingly, all words which have undergone this vowel assimilation process have the same word prosodic pattern, albeit a different one in each of the dialects of Maˈya (see Table 3). In all three dialects, lexical stress in these words is on the penultimate.

6.3.3. Unstressed non-final vowels tend to be /a/

A number of phonological processes, diachronic and synchronic, conspire in causing unstressed syllables that are not word-final to have the vowel /a/. There are some exceptions, but these are mostly limited to words of foreign origin. In words with three or more syllables, all syllables – apart from the penultimate and the final – have the vowel /a/, and if the final syllable is stressed, then the penultimate vowel is /a/ as well. The phonological processes responsible for this situation are listed below.

6.3.3.1. The prefix /ka-/

As compared with their cognates in other RASH languages, many Maˈya nouns feature an initial syllable /ka-/. The distribution of this prefix is limited to nouns, and therefore it can be analyzed as a noun marker. Because the nouns carrying the prefix refer to a heterogeneous set of concepts, there does not appear to be a more specific meaning. A number of examples are listed below. Many more examples can be

found in the Maˈya wordlists in Appendix A, but most of them cannot be readily associated with a PAN root.

*hutek	> My /kaˈut(o)/, Bl /uta/, Sw (Weda dialect) /uto/ ‘head’
*lipen	> My /kaˈli^{3}f/ ‘tooth’
*batu	> My /kaˈpa^{12}t/, Bl /pat/ ‘stone’
*saŋah	> My /kaˈʃa^{12}n/ ‘branch, forked wooden object’
?	> My /kaˈle^{12}p/, Bl /lop,lepa/ ‘hole’
*wakaR	> My /kaˈwat(-o)/, Bl /wa/, Wd /war/, Am /ekawak(-i)/ ‘root’

The initial /ka-/ prefix never carries lexical stress, and as a consequence, the process of /ka-/ prefixation creates polysyllabic words with final stress.

6.3.3.2. Verbal prefixes

Van der Leeden (ms. 2) reports that Maˈya verb roots take three kinds of prefixes, two of which are derivational, the other being inflectional. The derivational prefixes are /-fa-/ (or /-f-/), which encodes, among others, causative and continuative meaning, and /-fala-/, which encodes reciprocity. Examples (VI.1) and (VI.2) illustrate the use of the derivational and inflectional affixes (from van der Leeden, ms. 2):

(6.1)	ˈeli^{3}	na-fa-ˈba^{12}m	po	ˈwaya^{3}
	name	3S-CONT-wash	PRP	water
	Eli is washing at the well.			

(6.2)	ma-fa-ˈma^{3}	ˈene	ˈdi^{3}
	2S-CAUS-ashamed	PRS1S	PROHIB
	Do not make me ashamed.		

The inflectional marking of subject agreement has various paradigms, and which of them a verb takes is largely predictable from its stem (van der Leeden, ms. 2). Verbs derived from adjectives or nouns take a syllabic prefix, with the vowel /a/ as the nucleus (see Table VI.6C).

Table VI.6: The morphological paradigms of subject agreement on verbs. Verbs are derived when their stem can be used as a noun or an adjective, or when the stem is preceded by a derivational affix. Both paradigms and analysis from van der Leeden (ms. 2).[63]

Verb classes:	**A. C-initial non-derived verbs**	**B. V-initial non-derived verbs**	**C. Derived verbs**
Examples:	/ˈba^{12}s/ ‘to lift’	/ˈw-a^{12}p/ ‘to row’	/wa-ˈbusu^{3}/ ‘to be lazy’
1 sg.	ˈb-y-a^{12}s	ˈy-a^{12}p	ya-ˈbusu^{3}
2 sg.	ˈm-b-y-a^{12}s	ˈmy-a^{12}p	ma-ˈbusu^{3}
3 sg.	ˈn-ba^{12}s	ˈny-a^{12}p	na-ˈbusu^{3}
1 pl. inc.	ˈt-ba^{12}s	ˈt-a^{12}p	ta-ˈbusu^{3}
1 pl. exc.	ˈm-ba^{12}s	ˈm-a^{12}p	ma-ˈbusu^{3}
2 pl.	ˈm-ba^{12}s	ˈm-a^{12}p	ma-ˈbusu^{3}
3 pl.	ˈba^{12}s	ˈw-a^{12}p	wa-ˈbusu^{3}

6.3.3.3. Noun derivation with /Ca(C)-/

Van der Leeden (Reesink 1998:611) notes that Maˈya features a derivational process by which nouns are derived from verbs. This phenomenon is reminiscent of /Ca-/ reduplication as reconstructed for PAN by Blust (1998). The prefix takes the form of a /C_1aC_2-/ initial syllable, where C_1 copies the word-initial onset consonant, and C_2 copies the second consonant of the stem, be it the coda of the first syllable or the onset of the second. The following examples from van der Leeden (ms. 1) illustrate this derivation process:

/panˈpo^{12}n/ ‘food’	< /-ˈpo^{12}n/ ‘to eat’
/sanˈsu^{3}n/ ‘clothes’	< /ˈsu^{3}n/ ‘to enter’
/pasˈpisi^{3}/ ‘illness’	< /ˈpisi^{3}/ ‘ill, sick’
/watˈwu^{3}t/ ‘(old) age’	< /-ˈwu^{3}t/ ‘to age, to grow old’
/maˈma^{3}/ ‘genitals’	< /-ˈma^{3}/ ‘to be ashamed’
/tanˈte^{12}n/ ‘portion’	< /ˈse^{12}n/ ‘to cut (e.g. food) food into portions’
/saˈsa^{12}/ ‘broom’	< /ˈsa^{12}/ ‘to broom’
/kasˈke^{12}s/ ‘book’	< /-ˈke^{12}s/ ‘to write’
/batˈbe^{12}t/ ‘obstacle’	< /-ˈbe^{12}t/ ‘to hit by mistake’
/ɟakˈɟa^{12}k/ ‘procedure’	< /-ˈda^{12}k/ ‘to go’

[63] While the paradigms of non-derived verbs are not relevant to this discussion, they are included so as to make available the data from van der Leeden (ms. 2).

6.3.3.4. Other cases

There are a number of other cases where Maˈya has added an unstressed initial syllable with the vowel /a/, as compared to the PAN root or cognates in other languages:

*miqmiq > My /taˈmi^{3}/ ‘urine’
? > My /paˈle^{3}/, Tb /lai/ ‘big’

Also, unstressed initial syllables are changed to /a/. As mentioned above, this process is evident from loan words, but it also clear from some words that are derived from a PAN root or that have cognates in other languages:

*menak > My /maˈna^{3}/[64], Wn /maŋ/, Mb /mna^{12}/ ‘animal fat [My], oil [Wn,Mb]’
? > My /maˈme^{3}/, Bl /meme/ ‘red [My], purple [Bl]’
? > My /maˈlo^{12}m/, Sw /-mɛlom/ ‘wet’

6.3.3.5. Conclusion – /a/ is the unmarked vowel in Maˈya

In summary, both morphological processes (derivational and inflectional prefixation on nouns on verbs) and phonological vowel change have the effect of adding initial syllables with the vowel /a/. These processes do not affect the position of final stress. As a consequence, when such processes affect an originally monosyllabic word, they will result in a disyllabic word with final stress and an initial syllable with the vowel /a/.

6.4. Discussion and conclusion

6.4.1. Tonogenesis

When a previously atonal language develops a lexical tone system, the tonemes develop from synchronic variation in f_0 on the vowel caused by different consonants (Hombert 1978). This phenomenon is referred to as tonogenesis. The best known causal factor of tonogenesis is a voicing contrast in stop consonants (see Hombert 1978 and references there). A vowel that follows a voiced stop – e.g. /p/ – intrinsically has higher f_0 than the same vowel following the corresponding unvoiced stop, in this case /b/. When tonogenesis takes place, this synchronic variation in vowel f_0 becomes a phonologically contrastive feature on the vowel. At the same time, the voicing contrast in stops that was the original cause of the synchronic

[64] Because the penultimate syllable has a nasal onset, this word probably had final rather than penultimate stress in Proto-SHWNG. It is possible that Maˈya deleted the penultimate vowel of *menak, as it did with the penultimate vowels of *natu ‘child’ and *maCa ‘eye’ (see above), but did not delete the penultimate onset. The /a/ was inserted epenthetically at a later stage.

variation in f_0 is lost. In this way, lexical contrasts that originally were maintained by a segmental contrast have come to be encoded instead by a tonal contrast.

Moreover, tonogenesis appears to go accompanied with a drift to monosyllabism. Complex tone languages with four or more tonemes, such as Thai, Vietnamese, and most Chinese languages, all feature a heavily monosyllabic lexicon. And when a language develops a lexical tone system, its lexicon becomes more monosyllabic. In this way, Austronesian Utsat lost the initial syllable of PAN disyllabic roots as it developed a lexical tone system with five tonemes (Maddieson & Pang 1993). Similarly, two other Austronesian languages, Yabem and Bukawa, lost the final syllable of PAN roots as they developed a two-toneme contrast (Ross 1993). The drift towards monosyllabism in relation to tonogenesis makes sense, because when a language can distinguish words paradigmatically through a toneme contrast between otherwise identical syllables, there is less need for words to differ segmentally. It seems probable, therefore, that this drift towards monosyllabism follows from the fact that syllables that do not carry a toneme are lost because they are no longer necessary to maintain lexical contrasts.

In summary, we have distinguished two hallmarks of tonogenesis: the loss of segmental contrasts and the drift towards monosyllabism.

6.4.2. Discussion – the development of the Ma'ya word prosodic system

With respect to tonogenesis in Ma'ya, it is striking that the only processes leading to monosyllabism took place in the development of Proto-SHWNG, which preceded the independent development of the phonological system of Ma'ya (see § VI.3.1). Two interpretations of this phenomenon are possible.

First, tonogenesis in Ma'ya could be interpreted to have taken place soon after the drift towards monosyllabism in Proto-SHWNG. This drift, which sets apart the SHWNG languages among the Austronesian languages, can then be explained as a first stage in the development of a lexical tone system. Importantly, this interpretation implies that Proto-SHWNG was probably used on Waigeo, the Raja Ampat island with the greatest variety in Ma'ya dialects. This interpretation is in disagreement with hypotheses that locate the homeland of Proto-SHWNG in Cendrawasih Bay (Blust 1978, 1985) or on Halmahera (Ross 1995:85).

Alternatively, tonogenesis in Ma'ya could have taken place well after the SHWNG languages had split. This hypothesis is more attractive, for two reasons. First, it is in agreement with the observation that lexical tone is rare among SHWNG languages. If lexical tone had developed higher up in the tree of genetic classification, it would likely have been retained in several SHWNG languages. Second, the discovery of a complex lexical tone system in Matbat, an Austronesian language with a strong Papuan influence, suggests that there was a Papuan tone language in the RA archipelago at the time of the arrival of Proto-SHWNG in the area. Lexical tone in Ma'ya can be attributed to this tone language or a related non-Austronesian language. This hypothesis can account for the anomalies of the Ma'ya tone system. If the language developed lexical tone through language contact rather

than through independent tonogenesis, then it is no longer a mystery why there was no drift towards monosyllabism.

The precise dynamics of tonogenesis in Maˈya – that is, which segmental pattern leads to which toneme – are still unclear. Monosyllabic Maˈya words deriving from PAN disyllabic roots with a light (CV) final syllable tend to have the High toneme, and monosyllabic words deriving from roots with the rhyme of the final syllable consisting of a diphthong (vowel + semivowel), tend to have the Rise toneme (see § VI.3.1). Each of these regularities, however, is compromised by a single exception. Also, monosyllabic words derived from PAN disyllabic roots ending in *R all have the Rise toneme, but the number of cases (3) is not sufficient to warrant strong claims. As a consequence, the issue of the segmental triggers of tonogenesis necessarily remains open. If it can be demonstrated that Maˈya tones are predictable from the segmental structure of PAN roots, this would imply that the apocopated final syllables of Proto-SHWNG – or some sorts of secondary cues dependent on them – were still there when Maˈya developed lexical tone. In that case the homeland of Proto-SHWNG could be safely assumed to be located in the Raja Ampat archipelago, more precisely on Waigeo.

In any case, when tonogenesis took place in Maˈya, its lexicon still had a large number of polysyllabic words. In this respect it is worthwhile contrasting Maˈya with Matbat.

In Matbat the drift towards monosyllabism did continue beyond the syncope and apocope processes distinguished for Proto-SHWNG by Blust (1978). For example, in Proto-SHWNG PAN *q,ʔ,H,S,x,j,R,ŋ merged with zero, and after this sound change the final vowel of PAN roots like *Rumaq ‘house’ became visible for an apocope process (Blust 1978), leading to e.g. /rum/ in Biak and /u^{3}m/ in Maˈya. In Matbat, though, the deletion of final PAN syllables goes further:

*C	*laŋiC	> Mb /ya^{12}ŋ/, Bl /laŋit/, Bk /nanek/ ‘sky’
*p	*qinep	> Mb /-e^{4}n/, My /w-ˈene^{3}f/, Sawai /-yɛnɛf/ ‘sleep’
*ŋ	*tu(n)daŋ	> Mb /ho^{121}l/ (1sg. /so^{121}l/), My /ˈsolo^{3}n/, Bl /totolaŋ/, Sw /tolɛn/ ‘to sit’
*n	PEMP *budan	> Mb /bu^{3}/, My /ˈbu^{3}s/, Tb /bulaŋ/, POC *pulan ‘white’

Also, a number of PAN roots have lost the penultimate syllable in Matbat. While deletion of the vowel of the penultimate syllable is one of the sound changes reported for Proto-SHWNG in Blust (1978), it is limited to a small number of words, in which the deleted vowel was originally preceded by a nasal onset (see § VI.3.1). In Matbat, on the other hand, the deletion process is less constrained:

*wahiR	> Mb /yi^{4}/, My /ˈwaya^{3}/ ‘water’
?	> Mb /ŋa^{21}t/, My /ˈwana^{3}t/, Bl /waŋto/, Sw /wɔŋɛt/ ‘fruit’
*enem	> Mb /no^{12}m/, My /ˈwono^{3}m/, Bl /wonam/ ‘six’
*qatay	> Mb /ta^{21}y/, My /ˈlati^{3}/, Bl /yatay/, Sw /yɔtɛy/ ‘liver’
?	> Mb /-o^{12}l/, My /w-ˈoso^{3}l/, Bl /osal/, Sw /-ɔsɛl/ ‘to stand’

In summary, the drift towards monosyllabism has been considerably stronger in Matbat than in other SHWNG languages. It is relevant to note here that Matbat does

not feature lexical stress (see Chapter V). The drift towards monosyllabism effectively reduces the potential of stress to encode prominence contrasts between the syllables of a word. It is precisely because the drift towards monosyllabism did not continue in Maˈya that the emergence of a lexical tone system did not lead to the end of lexical stress in Maˈya as well. Because final apocope was limited to words derived from a PAN root ending in a vowel, a semivowel, or in *q,ʔ,H,S,x,j,R,ŋ, there remained a large number of polysyllabic words. These words retained penultimate stress, which, as the evidence from apocope suggests, was the most common stress pattern in Proto-SHWNG.

As mentioned above, a considerable proportion of the Maˈya lexicon was polysyllabic after the language had developed a lexical tone system, consisting mostly of disyllabic words with penultimate stress. Maˈya did not develop contrastive lexical tone in these polysyllabic words. Instead, the penultimate stressed words all got the same tonal pattern on the final syllable. The tone pattern on the final syllable probably consisted of the High toneme, since this is the toneme on the final syllable of words with penultimate stress in both the Salawati dialect and the Laganyan dialect of Waigeo. Because this tone pattern was not phonologically contrastive, it was not conserved well after the dialect split: in the Misool dialect, penultimate stressed words have the Rise toneme on the final syllable.

The vowel assimilation process that took place in Maˈya has been very productive in the penultimate stressed polysyllabic words. This development can be related to the lexical tone system. When a language develops lexical tone, its words tend to become monosyllabic: as new – prosodic – dimensions of lexical contrast are added, segmental lexical contrast is diminished. The vowel assimilation process has the same effect. Instead of syllables being deleted, they are made to some extent redundant by the fact that their vowel is predictable from another vowel in the word.

The following step would be to delete the redundant syllables. This is what actually happens in the Waigeo dialects. In a synchronic process, the vowels of open final syllables of words with penultimate stress are deleted whenever the word is not followed by a higher-level phrase boundary (see § VI.2.3).

After Maˈya developed lexical tone, a number of diachronic and synchronic morphological processes added initial unstressed syllables with the vowel /a/ to words that were initially mostly monosyllabic. As the morphologically derived forms retained the lexically contrastive toneme (either High or Rise) of the original root, this process led to the formation of polysyllabic words with a contrastive toneme and lexical stress on the final syllable, and with the non-final vowels invariably /a/. Lexical stress is contrastive between these words and the penultimate stressed ones, most of which have the same vowel in the initial and final syllables.

6.4.3. Conclusion

At the beginning of this chapter it was observed that lexical stress, lexical tone and the distribution of vowels are constrained by one another in Maˈya. These

constraints (reproduced below), can now be attributed to the historical developments discussed above.

I. If a polysyllabic word has a vowel other than /a/ in the penultimate syllable, it can only have penultimate stress. Otherwise, stress is contrastive, either on the penultimate or on the final syllable.

II. If a polysyllabic word has a vowel other than /a/ in the penultimate syllable, the vowels of penultimate and final syllables are usually the same.

III. Words with penultimate stress can only have a High toneme; words with final stress can have either the High or the Rise tonemes.

With respect to constraints (I) and (II) above, we observe the following. In Maˈya, many disyllabic words with final stress have been derived from originally monosyllabic words by addition of an initial syllable with the vowel /a/. Words with penultimate stress, on the other hand, tend to have the same vowel in both syllables, as a consequence of the vowel assimilation process discussed in § VI.3.2. Contrastive stress, therefore, is limited to words with the penultimate syllable vowel /a/, and mostly with final vowel also being /a/ (see Table VI.7).

Table VI.7: Maˈya minimal stress pairs, by stress location.

Penultimate stress /ˈ**n-**^{3}/	**Final stress** /**n-**ˈ^{3}/
ˈtala^{3} ‘banana’	taˈla^{3} ‘k.o. plant’
ˈkaya^{3} ‘rich’ (M. loan)	kaˈya^{3} ‘machete’
ˈmana^{3} ‘light (of weight)’	maˈna^{3} ‘grease’
ˈkali^{3} ‘to dig’	kaˈli^{3} ‘faeces’
ˈkala^{3} ‘k.o. tree’	kaˈla^{3} ‘k.o. palm tree’
ˈkai^{3}n ‘betel ingredients’	kaˈi^{3}n ‘k.o. game’

Constraint (III) follows from the observation that in polysyllabic words, tonal contrast is limited to the final syllable of final stressed words. This is because these words are derived from monosyllabic words, and at an earlier stage only monosyllabic words had contrastive lexical tone in Maˈya.

7 Conclusion

7.1. Recapitulation of research questions and main findings

The investigations reported in the chapters of this book were motivated by the discovery that the Salawati dialect of the Austronesian language Ma'ya features a hybrid word prosodic system with both contrastive lexical stress and lexical tone (see Chapter II). No other language has been reported to feature such a word prosodic system. This discovery raised two questions:

I. How did Ma'ya develop a word prosodic system with both stress and tone? An answer to this question could reveal why such a hybrid system is so rare.

II. What are the word prosodic systems of closely related languages like, and what kind of dialectal variation do we find between Ma'ya dialects in terms of their word prosodic systems? Investigations into these related word prosodic systems could produce more interesting data.

Question I was answered in Chapter VI, where Ma'ya words were compared with cognates in related languages in order to find evidence of segmental processes that have implications for the word prosodic system. The main finding of this investigation was that, unlike most other Asian tone languages (e.g. Thai, Chinese), tonogenesis in Ma'ya did not go together with a trend towards a more monosyllabic vocabulary. As a consequence, the stress feature which Ma'ya had inherited from its ancestor language was retained in the lexicon. I have hypothesized that the reason why tonogenesis in Ma'ya was not accompanied by a trend towards monosyllabism has to do with contact situation between Austronesian and Papuan languages (see § VII.2).

As for Question II, the study of the word prosodic systems of other dialects of Ma'ya and other related languages began with a survey of the language situation of the Raja Ampat archipelago (Chapter II). Apart from being welcome in its own right, this survey revealed that three out of five Ma'ya dialects feature lexical tone, and that there is one other tone language in the Raja Ampat archipelago: Matbat. The dialectal variation in the tone system of Ma'ya and the Matbat tone system were investigated in Chapter IV and V, respectively.

The discovery of a five-toneme contrast for Matbat is surprising, since it is only the fifteenth tone language out of 1,236 Austronesian languages. This discovery, in combination with evidence of Papuan influence in the lexicon, suggests that Matbat developed this feature through contact with non-Austronesian tone language. It also

constitutes indirect support for the hypothesis that Ma'ya developed its tone system through contact with a Papuan language.

The existence of three Ma'ya dialects with lexical tone provided an opportunity to gain insight in how tone languages change over time. Since the differences between the tone systems of the three dialects were relatively small, it was possible to determine the origin of changes by means of between-dialect comparison. This study revealed that the Misool dialect has undergone a push-chain tone shift, and that the Laganyan dialect had developed a boundary tone. Both of these phenomena can be traced back to synchronic variation in Ma'ya before the dialect split, since evidence of this synchronic variation has been retained in some dialects.

7.2. General discussion

7.2.1. Why are languages with both stress and tone rare?

An important conclusion of this dissertation is that a tone language can feature lexically contrastive stress. While there is no logical argument for why this combination of word prosodic features should be ruled out, no language had been demonstrated to feature both.

It was mentioned in Chapter III that one potential problem with such a hybrid system is the issue of phonetic encoding. In languages featuring lexical stress, f_0 marks pragmatic contrasts on certain stressed syllables. In a tone language on the other hand, f_0 marks a lexical contrast. If a language with both tone and stress would mark pragmatic contrasts by means of f_0, there would be ambiguity between the pragmatic and the lexical functions of this prosodic parameter. Evidently, this potential problem does not stand in the way of a system with both stress and tone. Like tone languages that do not feature lexical stress, Ma'ya does not seem to use f_0 to mark intonational contrasts: there is no f_0-marking on lexically stressed syllables that do not carry a toneme.

However, while there does not seem to be an acoustic problem with the hybrid stress + tone system of Ma'ya, the investigation of the factors that led to this unusual word-prosodic system suggests an explanation of why such a system is so rare. In Chapter VI it became clear that tonogenesis in Ma'ya was not accompanied by a drift towards monosyllabism beyond the syllable deletion processes that took place in Proto-SHWNG, its parent language, which most likely had lexical stress but no lexical tone. As a consequence, a considerable proportion of the Ma'ya lexicon was polysyllabic (predominantly disyllabic) when tonogenesis took place, and these words retained stress on the penultimate syllable. Stress and tone then existed in separate parts of the lexicon: stress in the polysyllabic words, and tone in the monosyllabic words. In summary, as there was no drift towards monosyllabism in Ma'ya, there remained a lot of polysyllabic material in which syntagmatic contrasts could be maintained. I attribute the unusual status of word prosodic systems with

both stress and tone to the fact that, usually, tonogenesis in a stress language involves a drift towards monosyllabism that goes all the way, reducing most of the previously polysyllabic words to monosyllables. In other words, tonogenesis eliminates the contexts in which syntagmatic contrasts are phonologically functional and phonetically salient.

7.2.2. Tonogenesis vs. tone retention

Apart from the absence of a drift towards monosyllabism, the Maˈya tone system is anomalous in a second way: there are no regular segmental triggers of tonogenesis. While in most cases of tonogenesis, a lexical tone contrast develops from allophonic variation in f_0 in function of a segmental contrast (e.g. voicing), no predictable relation between tonemes and segmentals could be established for Maˈya.

How can these unusual characteristics of tonogenesis in Maˈya be explained? In Chapter V, I have argued that both Maˈya and Matbat got lexical tone from the Papuan substrate language or languages that were used in the Raja Ampat archipelago before the arrival of Proto-SHWNG. When contact between these languages and Proto-SHWNG led to the development of Maˈya and Matbat, the latter retained linguistic features of their Papuan substrate. So rather than being the product of tonogenesis – tones coming into existence – the tone systems of Maˈya and Matbat are the result of retention. Such a retention of a word prosodic feature in a contact situation is not unusual. Similarly, Shetland Scots retained a durational feature of its substrate language Norse (van Leyden, to appear), and Papiamentu retained a tonal feature of its west African substrate (see below). This retention hypothesis can account for the unusual characteristics of the Maˈya tone system signaled above. No segmental triggers of tonogenesis could be found for Maˈya, because the Maˈya tones did not develop from a segmental contrast in Maˈya in the first place. The Maˈya lexicon did not become monosyllabic because the incorporation of Proto-SHWNG lexical items did not happen simultaneous with tonogenesis, which took place in the non-Austronesian substrate language long before the arrival of the Austronesians.

A number of factors indicate that the influence of Proto-SHWNG in the formation of Matbat was more limited than in the case of Maˈya. Different from Maˈya, Matbat reduced many of the lexical items it incorporated from Proto-SHWNG to monosyllables, bringing them in line with its non-Austronesian vocabulary. The more limited influence of Proto-SHWNG on Matbat is also evident from the lexicon, more of which is non-Austronesian in Matbat than in Maˈya. The difference between the Austronesian impact on Maˈya and Matbat has a parallel in the physique of members of these language communities: the Matbat are much closer to the Papuan stereotype (frizzy hair, big nose, dark brown skin, etc.) than the Maˈya.

As far as I know, there is, apart from Maˈya, only one other language that combines contrastive stress with a tonal feature. This language, Papiamentu, is a Caribbean creole. It developed in a contact situation with on the one hand Portuguese and/or Spanish, both featuring lexical stress, and on the other hand the

presumably tonal languages of west African slaves. Papiamentu has been analyzed as a tone language (Römer 1991, Kouwenberg & Murray 1994), but it can be interpreted better as a pitch-accent system, that is, with a syntagmatically contrastive feature marked by f_0 (see § III.1.2.2). Apart from pitch-accent, Papiamentu also has contrastive lexical stress. While it is unclear how this combination of pitch-accent and lexical stress developed in Papiamentu, it is striking that here too, a hybrid word prosodic system appears to have developed through language contact rather than through spontaneous development. In other words, the available evidence from Maˈya and Papiamentu suggests that hybrid word prosodic systems with contrastive lexical stress can only develop through contact between languages that feature the component features of the hybrid system as single word prosodic features.

7.3. Loose ends and suggestions for further research

7.3.1. Hybrid word prosodic systems

Maˈya is the only language reported to feature both contrastive stress and lexical tone. I have attributed the scarcity of hybrid systems with stress and tone to the inherent conflict between tonogenesis and a syntagmatic word prosodic contrast. Undoubtedly, another factor is a lack of relevant data. Hybrid word prosodic systems are very rare, and they risk to be analyzed in a different way, simply because the researcher does not consider the possibility of a hybrid system. More combined phonological-phonetic research is needed into the word prosodic systems of tone and pitch-accent languages in order to determine whether the word prosody of Maˈya is as unique as it seems.

In any phonetic study on a language featuring a hybrid word prosodic system, it would be worthwhile to take into consideration intonational variables. This would give insight in how three prosodic features interact: intonational accent, lexical stress, and lexical pitch-accent or tone. When a hybrid system features stress in combination with pitch-accent or tone, there is no conflict between the encodings of the word prosodic features: tone or pitch-accent are encoded by f_0, and stress by other prosodic parameters. It remains to be investigated in detail whether there is any room for intonational contrasts in such a loaded prosodic system.

A second way in which the study of hybrid word prosodic system can be improved is by determining the relative importance of the prosodic correlates by a perception test in which the potential stress correlates are varied experimentally. Such an approach is better than Linear Discriminant Analysis. Whereas the latter shows the relative amount of information available to the listener in the various potential stress correlates, the former approach reveals which cues the listener actually uses, and how they are weighed.

It would be very much worthwhile to carry out phonetic research on the other hybrid word prosodic system with contrastive stress: Papiamentu. As noted in §

III.1.2.2, Papiamentu appears to have a word prosodic system with contrastive lexical stress and contrastive pitch-accent. This language therefore constitutes the only opportunity to find out how stress and pitch-accent are encoded in such a system. I intend to carry out such an investigation, taking to heart the above recommendations on how to improve the analysis.

7.3.2. The languages of the Raja Ampat archipelago

Very little is known about Raja Ampat languages other than Ma'ya. Our knowledge on these languages is limited to wordlists, and even those most basic data are not available for Bata. The most worthwhile objects of language documentation, however, are the Matbat and Ambel languages.

The current, admittedly limited state of our knowledge suggests that Biga and the language(s) / dialect(s) of the land-oriented groups of Salawati are similar to Ma'ya, at least in terms of their vocabulary, and possibly in a more general sense. Ambel and Matbat, on the other hand, appear to be more different. Both are mutually unintelligible with Ma'ya, and feature more lexical dissimilarity as compared to Ma'ya. This dissimilarity stems from the fact that a considerable proportion of the vocabularies of Matbat and Ambel are not Austronesian.

Although we know very little about the structural properties of Matbat and Ambel, we find strong indications of Papuan influence here: Matbat has a lexical tone system with 5 tonemes; Ambel appears to feature morphological marking of aspect, a decidedly Papuan feature. A thorough investigation of the morphosyntactic systems of Matbat and Ambel would probably be rewarded with the discovery of more typically Papuan phenomena. Such research would complement the investigations of Reesink (1998) on the Papuan languages of the Bird's Head, which is adjacent to the Raja Ampat archipelago. Whereas Reesink highlighted the typically Austronesian features of Papuan languages, such studies on Ambel and Matbat would document the Austronesian side of this *Sprachbund*.

Specifically for Matbat, there is also the issue of dialectal variation. It is unclear how different the dialects distinguished by native speakers are, and whether all of them feature lexical tone.

7.3.3. The genetic classification of the Raja Ampat languages

I have classified the Raja Ampat languages in the same subgroup as the SHWNG languages of South Halmahera. In order to reflect the substantial proportion of Raja Ampat languages in this subgroup, I have proposed that it be called Raja Ampat-South Halmahera (RASH) rather than South Halmahera (SH). The classification of the RA languages in this subgroup is based on evidence of phonological changes (cf. Blust 1978), in which the Raja Ampat languages pattern with the SHWNG languages of South Halmahera. This classification, though justified on the basis of the available data, has two important weaknesses.

One weakness is that it fails to express the variation in non-Austronesian or Papuan lexical items and grammatical features in these languages. In particular, Matbat and Ambel have a large number of non-Austronesian lexical items. It is unclear where one should draw the line and hypothesize that these are Papuan languages (cf. Foley 1998).

Second, the classification of the RA languages as Austronesian is speculative because so little is known about their grammars. Again in particular for Matbat and Ambel, I expect that a detailed morphosyntactic analysis of RA languages would reveal typically Papuan features.

References

Adriani, N. and Kruijt, A.C. (1914) *De Bare'e-sprekende Toraja's van midden-Celebes*. Verhandeling Koninklijke Nederlandse Academie der Wetenschappen. Batavia: Landsdrukkerij (3 vols.). [in Dutch; on the Toraja people of Sulawesi]

Baak, C., Bakker, M., and Meij, D. van der (1995) *Tales from a concave world: liber amicorum Bert Voorhoeve*. Leiden: Leiden University - Department of Languages and Cultures of Southeast Asia and Oceania.

Bateman, J. (1990) Iau segmental and tone phonology. In B. Kaswanti Purwo (ed.) *Miscellaneous Studies of Indonesian and Languages in Indonesia Pt. X*. NUSA 32. Jakarta: Atma Jaya.

Beckman, M. (1986) *Stress and non-stress accent*. Dordrecht: Foris Publications.

Bellwood, P. (1997) *The Prehistory of the Indo-Pacific Archipelago*. Honolulu: University of Hawaii Press (2nd edition).

Bellwood, P. (1998) From Bird's Head to bird's eye view: long term structures and trends in Indo-Pacific prehistory. In J. Miedema, C. Odé and R.A.C. Dam (eds.) 951-975.

Berinstein, A.E. (1979) *A Cross-Linguistic Study on the Perception and Production of Stress*. University of California at Los Angeles Working Papers in Phonetics 47.

Berry, C. (1998) The art of the storyteller in Abun society. In J. Miedema, C. Odé and R.A.C. Dam, (eds.), 519-534.

Blust, R. (1978) Eastern Malayo-Polynesian: A Subgrouping Argument. In S. Wurm and L. Carrington (eds.), 181-234.

Blust, R. (1985) The Austronesian homeland: a linguistic perspective. *Asian Perspectives* 26: 45-67.

Blust, R.A. (ms.) *Austronesian Comparative Dictionary*. Unpublished manuscript. [ms. in progress – quoted with author's permission]

Boersma, P. (1993) Accurate short-term analysis of the fundamental frequency and the harmonics-to-noise ratio of a sound. *Proceedings of the Institute of Phonetic Sciences of the University of Amsterdam* 17, 97-110.

Boersma, P. and Weenink, D. (1996) *PRAAT: A system for doing phonetics by computer*. Report of the Institute of Phonetic Sciences of the University of Amsterdam 132. [http://www.praat.org]

Bowden, J. (1997) *Taba (Makian Dalam) – Description of an Austronesian language from Eastern Indonesia*. Ph.D. diss. University of Melbourne.

Bruce, G. (1977) *Swedish word accents in sentence perspective*. Travaux de l'Institut de Linguistique de Lund vol. XII. Lund: CWK Gleerup.

Cambier-Langeveld, T. (2000) *Temporal Marking of Accents and Boundaries*. Leiden University (Holland Institute of Generative Linguistics) Ph.D. dissertation.

Chang, N.-C. (1958) Tones and intonation in the Chengtu dialect (Szechuan, China). *Phonetica* 2: 59-84.

Clark, R. (1987) Austronesian languages. In B. Comrie (ed.*) The world's major languages*. London/Sydney: Croom Helm, 899-912.

Clercq, F.S.A de (1893) De West- en Noordkust van N.-Guinea. *Tijdschrift van het Koninklijk Aardrijkskundig Genootschap* vol. X, 151-211. [in Dutch; geographic and general anthropological study on the Raja Ampat archipelago]

Cohn, A. (1989) Stress in Indonesian and bracketing paradoxes. *Natural Language and Linguistic Theory* 7, 167-216.

Collins, J.T. (1982) A short vocabulary of East Makian. In C.L. Voorhoeve (ed.), 99-128.

Collins, J.T. (1998) *Malay, world language: a short history*. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Dempwolff, O. (1934) *Vergleichende Lautlehre des austronesischen Wortschatzes, 1: Induktiver Aufbau einer indonesischen Ursprache*. Zeitschrift fur Eingeborenen Sprachen (Beiheft 15).

Dempwolff, O. (1937) *Vergleichende Lautlehre des austronesischen Wortschatzes, 2: Deduktive Anwendung des urindonesischen auf austronesischen Einzelsprachen*. Zeitschrift fur Eingeborenen Sprachen (Beiheft 17).

Dempwolff, O. (1938) *Vergleichende Lautlehre des austronesischen Wortschatzes, 3: Austronesiches Wörterverzeichnis*. Zeitschrift fur Eingeborenen Sprachen (Beiheft 19).

Diamond, J. (1998) *Guns, Germs and Steel – A Short History of Everybody for the Last 13,000 Years*. London: Vintage.

Dixon, R.M.W. (1997) *The rise and fall of languages*. Cambridge (UK): Cambridge University Press.

Donohue, M. (1997) Tone systems in New Guinea. *Linguistic Typology* 1, 347-386.

Downing, L. (to appear) Accent in African languages. In R.W.N. Goedemans and H.G. van der Hulst (eds.) *Stress patterns of the world: Data*. Amsterdam: John Benjamins.

Drooglever, P.J. (1998) Documents on the contest for Western New Guinea / Irian Barat, 1945-1963. In J. Miedema, C. Odé and R.A.C. Dam (eds.), 479-486.

Dyen, I. (1953) *The Proto-Malayo-Polynesian laryngeals*. Baltimore: Linguistic Society of America.

Dyen, I. (1965) *A Lexicostatistical Classification of the Austronesian Languages*. International Journal of American Linguistics Memoir 19.

Edmondson, J.A. and Gregerson, K.J. (1993) Western Cham as a Register Tone language. In J.A. Edmondson and K.J. Gregerson (eds.), 61-74.

Edmondson, J.A. and Gregerson, K.J. (1993) *Tonality in Austronesian Languages*. Oceanic Linguistics Special Publication No. 24.

Esser, S.J. (1938) Talen. In *Atlas van tropisch Nederland*. Amsterdam: Koninklijk Nederlands Aardrijkskundig Genootschap. [in Dutch; section on languages in atlas of tropical colonies of The Netherlands]

Foley, W.A. (1986) *The Papuan Languages of New Guinea*. Cambridge (UK): Cambridge University Press.

Foley, W.A. (1998) Toward understanding Papuan languages. In J. Miedema, C. Odé and R.A.C. Dam (eds.), 503-518.

Fromkin, V.A. (1978) *Tone: a linguistic survey.* New York: Academic Press.

Fry, D.B. (1955) Duration and intensity as physical correlates of linguistic stress. *Journal of the Acoustical Society of America* 27, 765-768.

Goedemans, R.W.N. and Zanten, E. van (to appear) Stress and accent in Indonesian. In D. Gil (ed.) *Malay / Indonesian linguistics.* London: Curzon Press.

Goodman, T. (1998) The sosolot exchange network of Eastern Indonesia during the seventeenth and eighteenth centuries. In J. Miedema, C. Odé and R.A.C. Dam (eds.) 421-454.

Grabe, E., Post, B., Nolan, F. and Farrar, K. (2000) Pitch-accent realization in four varieties of British English. *Journal of Phonetics* 28, 161-185.

Gray, R.D. and Jordan, F.M. (2000) Language trees support the express-train sequence of Austronesian expansion. *Nature* 405, 1052-1055.

Greenwood, D.D. (1961) Critical bandwidth and the frequency coordinates of the basilar membrane. *Journal of the Acoustical Society of America* 33, 1344-1356.

Grimes, B.F. (ed.) (1996) *Ethnologue*. Dallas: Summer Institute of Linguistics (13th edition). [http://www.sil.org/ethnologue/]

Gussenhoven, C. and Bruce, G. (1999) Word prosody and intonation. In H. van der Hulst (ed.) *Word Prosodic Systems in the Languages of Europe*. Berlin: Mouton de Gruyter, 233-272.

Hanna, W.A. and Alwi, D. (1990) *Turbulent times past in Ternate and Tidore*. Banda Naira (Indonesia): Yayasan Warisan dan Budaya.

Hajek, J. (1995) A Mystery Solved: the Forgotten Tone Languages of New Ireland. *University of Melbourne Working Papers in Linguistics* 14, 9-14.

Haenen, P. (1991) *Weefsels van wederkerigheid – Sociale structuur bij de Moi van Irian Jaya*. Ph.D. dissertation Katholieke Universiteit Nijmegen. [in Dutch; anthropological study on the Moi ethnicity of the Bird's Head of New Guinea]

Halim, A. (1984) *Intonation in relation to syntax in Indonesian*. Pacific Linguistics D-36.

Hartzler, D. (1978) *Waigeo Survey Report*. Jayapura: Summer Institute of Linguistics and Universitas Cendrawasih [unpublished typewritten report].

Hermes, D.J. and Gestel, J.C. van (1991) The frequency scale of speech intonation. *Journal of the Acoustical Society of America* 90, 97-102.

Hombert, J.-M. (1978) Consonant Types, Vowel Quality, and Tone. In V.A. Fromkin (ed.), 77-112.

Horst Pellekaan, R.E. van, Regt, I.C. de, and Bastiaans, J.F. (1990*) Patrouilleren voor de Papoea's – de Koninklijke Marine in Nederlands Nieuw Guinea*. Amsterdam: De Bataafsche Leeuw (2 vols.). [in Dutch; historical study on the role of the Dutch Navy in Dutch New Guinea between World War II and the end of Dutch rule]

Huizinga, F. (1998) Relations between Tidore and the North Coast of New Guinea in the nineteenth century. In J. Miedema, C. Odé and R.A.C. Dam, (eds.), 385-419.

Hulst, H. van der, and Smith, N. (1988) The variety of pitch-accent systems – Introduction. In H. van der Hulst and N. Smith (eds.) *Autosegmental studies on pitch-accent*. Dordrecht: Foris Publications.

Hyman, L.M. (1978) Historical Tonology. In V.A. Fromkin (ed.), 257-270.

Joubert, S.M. (1991) *Dikshonario Papiamentu-Hulandes – Handwoordenboek Papiaments-Nederlands*. Curacao: Fundashon di Leksikografia.

Kamma, F.C. (1948) De verhouding tussen Tidore en de Papoese eilanden in legende en historie. *Indonesië* 1, 361-370 and 536-559; 2, 177-188 and 256-275. [in Dutch; on the relation between Tidore and the Raja Ampat archipelago, based on written sources and legends]

Kamma, F.C. (1977) *Dit Wonderlijke Werk*. Oegstgeest (the Netherlands): Raad voor de Zending der Nederlandse hervormde Kerk (2 vols.). [in Dutch; historical study of the protestant mission in Dutch New Guinea]

King, R.D. (1969) Push Chains and Drag Chains. *Glossa* 3, 3-21

Klatt, D.H. (1976) Linguistic uses of segmental duration in English: Acoustic and perceptual evidence. *Journal of the Acoustical Society of America* 59, 1208-1221.

Kouwenberg, S. (ms.) *The grammatical function of Papiamentu tone*. Unpublished manuscript.

Kouwenberg, S. and Murray, E. (1994) *Papiamentu*. Languages of the world / Materials 83. München-Newcastle: Lincom Europe.

Ladd, D.R. (1996) *Intonational phonology*. Cambridge (UK): Cambridge University Press.

Laksman, M. (1994) Location of stress in Indonesian words and sentences. In C. Odé and V.J. van Heuven (eds.) *Experimental studies of Indonesian prosody*. Leiden: Leiden University - Department of Languages and Cultures of Southeast Asia and Oceania, 108-139.

Laniran, Y.O. (1993) *Intonation in Tone Languages: The Phonetic Implementation of Tones in Yorùbá*. Ph.D. thesis, Cornell University.

Laycock, D. (1978) A Little Mor. In S. Wurm and L. Carrington (eds.), 285-316.

Leeden, A.C. van der (1980) Report on Anthropological Field Research at the Northern Raja Ampat Islands, March-June 1979. In E.K.M. Masinambow (ed.): *Halmahera dan Raja Ampat. Konsep dan Strategi penelitian*. Jakarta: Lembaga Ekonomi dan Kemasyarakatan Nasional - Lembaga Ilmu Pengetahuan Indonesia, 205-214.

Leeden, A.C. van der (1983) Ga'le12 Ma'ya3 – Phonology of a Tone Language of the Raja Ampat Islands. In E.K.M. Masinambow (ed.): *Halmahera dan Raja Ampat sebagai Kesatuan Majemuk. Studi-studi terhadap suatu Daerah Transisi*. Buletin Lembaga Ekonomi dan Kemasyarakatan Nasional, Vol.II No.2. Jakarta: Lembaga Ilmu Pengetahuan Indonesia, 77-146.

Leeden, A.C. van der (1989) The Myth of Wawage. In P. Haenen and J. Pouwer (eds.), *Peoples on the Move. Current themes of anthropological research in New Guinea*. Nijmegen: University of Nijmegen – Center for Australian and Oceanic Studies, 102-134.

Leeden, A.C. van der (1993) *Ma'ya: a language study: A Phonology*. Jakarta: Lembaga Ilmu Pengetahuan Indonesia and Rijksuniversiteit Leiden.

Leeden, A.C. van der (1995) World War II in Samate. In C. Baak, M. Bakker, and D. van der Meij (eds.), 381-388.

Leeden, A.C van der (1997) A tonal morpheme in Ma'ya. In C. Odé and W. Stokhof (eds.): *Proceedings of the Seventh International Conference on Austronesian Linguistics*. Amsterdam-Atlanta, GA: Rodopi.

Leeden, A.C. van der (ms. 1) Ma'ya dictionary. [unfinished ms.]

Leeden, A.C. van der (ms. 2) Ma'ya morphology and syntax. [unfinished ms.]

Leyden, K. van (to appear) The relationship between vowel and consonant duration in Orkney and Shetland dialects. To appear in *Phonetica*.

Liljencrants, J. and Lindblom, B. (1972) Numerical simulations of vowel quality systems: the role of perceptual contrasts. *Language* 48, 839-862.

Loftus, G.R. and Loftus, E.F. (1988) *Essence of statistics*. New York: Knopf (2nd edition).

Maan, G. (1940) *Boelisch-Nederlandse woordenlijst*. Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen 74. [in Dutch; Buli-Dutch dictionary]

Maan, G. (1951) *Proeve van een Bulische spraakkunst*. The Hague: Verhandelingen in de Taal-, Land- en Volkenkunde 10. [in Dutch; a descriptive grammar of the Buli language]

Maddieson, I. (1985) Phonetic Cues to Syllabification. In V.A. Fromkin (ed.) *Phonetic linguistics – Essays in Honor of Peter Ladefoged*. Orlando: Academic Press, 203-222.

Maddieson, I. and Pang, K.F. (1993) Tone in Utsat. In J.A. Edmondson and K.J. Gregerson (eds.), 75-89.

Maddieson, I. (1997) Phonetic universals. In W.J. Hardcastle and J. Laver (eds.) *The handbook of phonetic sciences*, 619-639. Oxford: Blackwell.

McAllister, L. and McAllister, K. (1991) The Process of Phonological Change in Doutai. In *Workpapers in Indonesian Languages and Culture* 9, 121-142. Jayapura (Indonesia): Universitas Cendrawasih and Summer Institute of Linguistics.

McCawley, J. (1978) What is a tone language? In V.A. Fromkin (ed.), 113-131.

Menick, R. (1995) Moi: a language of the West Papuan Phylum – a preview. In C. Baak, M. Bakker, and D. van der Meij (eds.), 55-73.

Miedema, J. (1984) *De Kebar 1855-1980 – Sociale structuur en religie in de Vogelkop van West-Nieuw-Guinea*. Verhandelingen van het Koninklijk Instituut voor Taal-, Land- en Volkenkunde vol. 105. Dordrecht (the Netherlands) / Cinnnaminson (USA): Foris Publications. [in Dutch; anthropological study on the Kebar area of the Bird's Head of New Guinea]

Miedema, J. and Stokhof, W.A.L. (1993) *Memories van Overgave van de Afdeling West Nieuw-Guinea (Part II)*. Leiden: Leiden University - Department of Languages and Cultures of Southeast Asia and Oceania. [in Dutch; reports from administrators of the western section of Ducth New Guinea]

Miedema, J., Odé, C., and Dam, R.A.C. (1998) *Perspectives on the Bird's Head of Irian Jaya, Indonesia – Proceedings of the Conference Leiden, 13-17 October 1997*. Amsterdam/Atlanta: Rodopi.

Minde, D. van (1997) *Malayu Ambong - Phonology, Morphology, Syntax*. Leiden: Leiden University Centre for Non-Western Studies vol. 61.

Mous, M. (1993) *A Grammar of Iraqw*. Cushitic Studies vol. 9. Hamburg: Helmut Buske.

Nederlands Nieuw Guinea (1:100,000). Topografische dienst Delft (1963) [Maps of Ducth New Guinea. The maps of the Raja Ampat islands are based on data from 1944]

Odé, C. (1998) The bird said 'I am here': a prosodic study of the *waimon* story in Mpur. In J. Miedema, C. Odé and R.A.C. Dam (eds.), 575-602.

Ohala, J. (1989) Sound change is drawn from a pool of synchronic variation. In L.E. Breivik and E.H Jahr (eds.) *Language Change – Contributions to the Study of its Causes*. Trends in Linguistics vol. 43, 173-198. Berlin: Mouton de Gruyter.

Overweel, J.A. (1998) “A systematic activity” – Military exploration in Western New Guinea 1907-1915. In J. Miedema, C. Odé and R.A.C. Dam (eds.), 455-478.

Peski, F. van (1914) *Beschrijving eener exploratie van het eiland Misool, met annex woordenlijst der taal*. Deventer (The Netherlands): Velders. [in Dutch; Description of an exploration of Misool, with wordlist in appendix]

Polansky, E.A. (1957) *Memorie van overdracht van het distitrict Salawati (Onderafdeling Radja Ampat Afdeling Nieuw Guinea)*. Unpublished ms. in the archive of the Koninklijk Instituut voor Taal-, Land-, en Volkenkunde, Leiden. [in Dutch; report by the colonial administrator of Salawati at the end of his term]

Potisuk, S. Gandour, J. and Harper M.P. (1996) Acoustic Correlates of Stress in Thai. *Phonetica* 53, 200-220.

Reesink, G. (1998) The Bird’s Head as Sprachbund. In J. Miedema, C. Odé and R.A.C. Dam (eds.), 603-642.

Remijsen, B. (2002) Lexically contrastive stress accent and lexical tone in Ma'ya. In C. Gussenhoven and N. Warner (eds.) *Laboratory Phonology VII*. Berlin/New York: Mouton de Gruyter.

Rivera-Castillo, Y. (1998) Tone and Stress in Papiamentu: the Contribution of a Constraint-Based Analysis to the problem of Creole Genesis. *Journal of Pidgin and Creole Languages* 13, 297-334.

Rivierre, J.-C. (1993) Tonogenesis in New Caledonia. In J.A. Edmondson and K.J. Gregerson (eds.), 155-173.

Römer, R. (1991) *Studies in Papiamentu tonology*. Caribbean Culture Studies 5. Amsterdam and Kingston: Amsterdam Centre for Caribbean Studies. [edited after the death of the author by N. Smith and J.M. Stewart]

Ross, M.D. (1993) Tonogenesis in the North Huon Golf Chain. In J.A. Edmondson and K.J. Gregerson (eds.), 133-154.

Ross, M.D. (1995) Some current issues in Austronesian linguistics. In D.T. Tryon (ed.), part 1, 45-120.

Schuh, R. (1978) Tone Rules. In V.A. Fromkin (ed.) 221-256.

Sluijter, A.M.C. (1995) *Phonetic correlates of stress and accent*. Leiden University (Holland Institute of Generative Linguistics) Ph.D. dissertation.

Sluijter, A.M.C. and Heuven, V.J. van (1996) Spectral balance as an acoustic correlate of linguistic stress. *Journal of the Acoustic Society of America* 100, 2471-2485.

Smits, L. and Voorhoeve, C.L. (1992) *The J.C. Anceaux collection of wordlists of Irian Jaya Languages. A: Austronesian languages*. Leiden: Leiden University - Department of Languages and Cultures of Southeast Asia and Oceania (2 vols.).

Sollewijn Gelpke, J.H.F. (1994) The Report of Miguel Roxo de Brito of his Voyage in 1581-1582 to the Raja Ampat, the MacCluer Gulf and Seram. *Bijdragen tot de Taal-, Land-, en Volkenkunde* 150, 123-145.

Sorong Dalam Angka 1998 – Sorong in Numbers 1998. Badan Pusat Statistik Kabupaten Sorong [Statistcs department of the administrative area of Sorong].

Spriggs, M. (1998) The archaeology of the Bird's Head in its Pacific and Southeast Asian context. In J. Miedema, C. Odé and R.A.C. Dam (eds.), 931-939.

Steinhauer, H. (1983) Notes on the Malay of Kupang (Timor). In J.T. Collins (ed.) *Studies in Malay dialects Part II*. NUSA vol. 17. Jakarta: Universitas Atma Jaya.

Steinhauer, H. (1985) Number in Biak: Counterevidence to two alleged language universals. *Bijdragen tot de Taal-, Land-, en Volkenkunde* 141, 462-485.

Taber, M. (1996) *Atlas Bahasa Tanah Maluku*. Ambon (Indonesia): Pusat Pengkajian dan Pengembangan Maluku (Universitas Pattimura) dan Summer Institute of Linguistics. [in Indonesian; language atlas of the Malulu province of Indonesia]

Teljeur. D. (1982) Short wordlists from South Halmahera, Kayoa, Makian, Ternate, Tidore and Bacan. In C.L. Voorhoeve (ed.), 129-148.

Trubetzkoy, N.S. (1939) *Grundzüge der Phonologie*. Travaux du cercle de linguistique de Prague vol. 7.

Tryon, D.T (1995) *Comparative Austronesian Dictionary*. Berlin: Mouton de Gruyter (5 vols.).

Tucker, A.N. [C.A. Creider, ed.] (1993) A Grammar of Kenya Luo (Dholuo). Köln: Rüdiger Köppe Verlag.

Vaissière, J. (1983) Language-independent prosodic features. In A. Cutler and D.R. Ladd (eds.) *Prosody: models and measurements*, 53-66. Berlin: Springer Verlag.

Voorhoeve, C.L. (1975) Central and western Trans-New Guinea Phylum languages. In S.A. Wurm (ed.*) New Guinea area languages and language study vol. 1*. Pacific Linguistics C 38, 345-360.

Voorhoeve, C.L. (1982) *The Makian languages and their neighbours*. Pacific Linguistics D-46.

Vries, L. de (1998) Some remarks of the linguistic position of the Inanwatan language. In J. Miedema, C. Odé and R.A.C. Dam (eds.), 643-653.

Wallace, A.R. (1869) *The Malay archipelago*. London: Macmillan (2 vols.).

Whisler, R. (1992) Phonology of Sawai. In D.A. Burquest and W.D. Laidig (eds.) *Phonological studies in four languages of Maluku*. Dallas: Summer Institute of Linguistics.

Whisler, R. and Whisler, J. (1995) Sawai introduction and wordlist. In D.T. Tryon (ed.), part 1, 659-665.

Wurm, S. (1994) Australasia and the Pacific. In C. Moseley and R.E. Asher (eds.) *Atlas of the world's languages*. London: Routledge.

Wurm, S. and Carrington, L. (1978) *Second International Conference on Austronesian Linguistics: Proceedings*. Pacific Linguistics C-61.

Wurm, S. and Hattori, S. (eds.) (1981) *Language atlas of the Pacific Area*, Parts I and II. Pacific Linguistics C-66, C-77.

Xu, Y. and Wang, Q.E. (1997) What can tone studies tell us about intonation? In A. Botinis, G. Kouroupetroglou, and G. Carayiannis (eds.) *Intonation: theory, models and applications. Proceedings of the ESCA Workshop (Athens, Greece, Sept. 18-20, 1997)*, 337-340.

Zanten, E. van, Stoel, R. and Remijsen, B. (to appear) Stress types in Austronesian languages. In R.W.N. Goedemans and H.G. van der Hulst (eds.) *Stress Patterns of the World: Data*. Amsterdam: John Benjamins.

Zorc, R.D. (1995) A glossary of Austronesian reconstructions. In D.T. Tryon (ed.), part 1, 1105-1197.

Appendix A Wordlists of Raja Ampat languages

A.1. Introduction

The wordlists below were collected by me during fieldwork in the RA archipelago. The list of lexical items is the extended (133-item) version of the 100-item Swadesh-list, as it appears in van der Leeden (1983). Van der Leeden extended the 100-word Swadesh list with with additional lexical items from the SIL Irian Jaya wordlist. Details regarding the collection of each list are presented in Appendix B.

The lists differ in the way they have been transcribed. Phonological descriptions exist for the Salawati and Misool dialects of Ma^{l}ya (van der Leeden 1983, 1993), and for Matbat (segmentals: Appendix B; word prosody: Chapter V). The lists for those languages have been transcribed phonologically. For the other languages, the transcription is phonetic. That is, the recorded speech segments reflect what I heard rather than an interpretation of the word in terms of the phonemes of the language. Likewise, when recorded, stress marks indicate perceived prominence rather than stress in a phonological sense.

If they are inflected, verbs are recorded in the 3rd person plural, with the subject-marking prefix, if any, separated from the stem by a hyphen. Nouns referring to inalienable body parts take inflection for possessor. In the wordlists they are transcribed in the 3rd person singular, which does not involve overt segmental morphological encoding (the 3rd sg. form of the possessive affix is a zero-morpheme in RA languages). In Salawati and Misool Ma^{l}ya, nouns that carry a High or a Rise lose these tonemes when they are inflected for possessor in the 3rd person singular. For example, third person singular forms /^{l}na(o)/ ‘his/her belly’ and /^{l}ara(o)/ ‘his/her tongue’ correspond to first person singular forms /^{l}na^{12}k/ ‘my belly’ and /^{l}ara^{3}k/ ‘my tongue’, respectively.

A.2. Wordlists collected on Misool and Salawati: Matbat, Biga, Misool Maˈya, Butleh and Salawati Maˈya

	English	Matbat	Biga	Misool Maˈya	Butleh (Fiawat)	Salawati Maˈya
1	I	ya^{21}k / ya^{21}ka	in	ˈene	ine	ˈene
2	you (sg.)	ya^{21}w / ya^{21}wa	ˈawa	ˈawa	aw	ˈawa
3	a) we (incl.)	a) ya^{21}t/ ya^{21}ta	a) itbaˈna	a) ˈakne	a) atne	a) ˈakne
	b) we (excl.)	b) ya^{21}m/ ya^{21}ma	b) ambaˈna	b) ˈamne	b) ame	b) ˈamne
4	this	ino	--not recorded--	ˈgine	eme	ˈgine
5	that	into/inyo	iˈtana	ˈgia	teypa	ˈgia
6	who	ma^{21}n	maˈpe	miˈsa-gia	metsapa	miˈsa
7	what	pane^{21}n	maˈne	fiˈsa-gia	nahapa	ˈfisa
8	all	batu^{12}p	baˈʃef	baˈse^{3}f	besih	baˈʃe^{3}f
9	much	to^{12}	moˈto	ˈmoto^{12}	mot	ˈmo^{12}t
10	one	te^{3}m	kaˈtem	kaˈte^{12}m	ətem	kaˈte^{12}m / ˈaksa / ˈsa
11	two	lu^{3}	lu	ˈlu^{3}	lu	ˈlu^{3}
12	big	li^{1}w	paˈley	paˈle^{3}	peley	paˈle^{3}
13	long	na^{41}ŋ	maˈlas	maˈla^{12}s	malah	maˈla^{12}s
14	small	wa^{3}y	kaˈnyan	gaˈna^{12}n	we	gaˈna^{12}n
15	woman	wayu^{1} / yo^{12}m	waˈbin	ˈpi^{3}n	bin	ˈpi^{3}n
16	man	wa^{3}yma^{21}n	waˈman	ˈma^{12}n	man	ˈma^{12}n
17	a) person	a) ma^{3}t	a)mat	b)maˈtumol(o)	met	a) ˈmat
	b) people		b)maˈtumol(o)			b) muˈtumol(o)
18	fish	yi^{1}n	don	ˈi^{12}n	kemon	ˈdo^{3}n

	English	Matbat	Biga	Misool Maˈya	Butleh (Fiawat)	Salawati Maˈya
19	bird	ipo^{121}	miˈni	ˈmini^{12}	min	ˈmini^{3}
20	dog	ye^{12}m	yes[65]	ˈye^{3}s	hewu	kaˈble^{3}
21	louse	wu^{3}t	wut	ˈu^{3}t	wut	ˈu^{3}t
22	tree	ha^{3}y	ay(o)	ˈai(o)	batan	ˈai(o)
23	seed	ya^{21}w	kaˈtum(o)	ˈʃum(o)	anlaw	kaˈyas(o)
24	leaf	da^{21}n	kaˈmuy(o)	kaˈlun(o)	emoy	kaˈlun(o)
25	root	de^{21}po / wa^{21}po	kaˈwat(o)	kaˈwat(o)	awa	kaˈwat(o)
26	bark	me^{21}y	ay kaˈin(o)	ˈga^{3} kaˈin(o)	ay eney	ˈga^{3} kaˈin(o)
27	skin a)human b)animal	me^{21}y	kaˈin(o)	a) kaˈini^{3} b) kaˈin(o)	eney	a)kaˈini^{3} b)kaˈin(o)
28	flesh, meat, fruit	ŋa^{21}t	ˈwanat(o)	ˈwana^{12}t	wanat	ˈwana^{3}t
29	blood	pe^{1}w	loˈmos	ˈlomo^{12}s	ləmoh	ˈlomo^{3}s
30	bone	bo^{21}m	kaˈbom(o)	kaˈbo^{12}m	abom	kaˈbo^{12}m
31	a) animal fat b) oil	a) mna^{12} b) mni^{12}k	a) maˈna(o)	a) maˈna^{12}	a) mena b) meɟul	a) maˈna^{3} b) maˈɟulu^{3}
32	egg	to^{21}l	toˈlo	ˈtol(o) / ˈtolo^{12} (sea turtle egg)	tol	ˈto^{12}l
33	horn	so^{21}p	ˈsobo	ˈtandu^{3} (<M.)	wosow	ˈtandu^{3} (<M.)
34	tail	saba^{21}ŋ	kaˈlu(o)	kaˈyu(o)	heluway	kaˈyu(o)

[65] Blust (ms.) notes that reflexes of PAN *\/asu\/ 'dog' are abundant in the Western and Central Malayo-Polynesian, but absent in the SHWNG and Oceanic languages. Interestingly, the words for 'dog' in Biga and Misool Maˈya (both /yes/) may be reflexes of the PAN root for this concept (/a-/ > /ya-/ is regular [Blust 1978]). The fact that this form is limited to languages of Misool suggests that it may well be loan from a Central Malayo-Polynesian language.

	English	Matbat	Biga	Misool Maˈya	Butleh (Fiawat)	Salawati Maˈya
35	feather	napo^{21}l	kaˈnun(o)	kaˈnyun(o)	enun	kaˈlun(o)
36	human hair a) head, b) body	a) blu^{12}n b) napo^{21}l	a) pa b) kaˈnun(o)	a) ˈplya^{12} b)kaˈnyunu^{3}t	enun	a) ˈplya^{3} b)kaˈnyunu^{3}t
37	head a) body, b) fig.	te^{121}lo	u(o)	kaˈu^{3}t	wom	a) kaˈut(o) b) kaˈu^{3}t
38	ear	ŋa^{21}bin	na(o)	taˈna(o)	tena	taˈna(o)
39	eye	mana^{21} (also face)	ta kaˈus(o)	ta kaˈbul(o)	ta	ˈta(o)
40	nose	maba^{21}y	saˈnu(o)	ʃoˈgul(o)	henyu	saˈgul(o)
41	mouth	pata^{21} / ga^{21}l (< Mis. Maˈya)	saˈmo(o)	ˈgal(o)	hemo	ˈgal(o)
42	tooth	pata^{21} (cf. mouth)	liˈfo(o)	kaˈli^{3}f	weli	kaˈlif(o)
43	tongue	para^{12}l	taˈleb(o)	ˈar(o)	telebey	ˈara(o)
44	nail	he^{21}m	kaˈip(o)	kaˈsi^{12}b	esip	kaˈsi^{3}p / kaˈʃi^{3}p
45	foot	we^{21}ta	kaˈi(o)	kaˈne pa^{12}p	eme pap	kaˈne ˈpa^{12}p
46	knee	we^{21}ta-pu^{21}k	kaˈi kaˈpuk(o)	kaˈpu^{3}k	epyabu	kaˈne kaˈpuk(o)
47	hand	ma^{21}ta	kaˈna(o)	kaˈne ˈle^{3}s	eme lih	kaˈne ˈle^{3}s
48	belly	sapa^{21}w	nya(o)	ˈna(o)	na	ˈna(o)
49	neck	ko^{12}k	gaˈlen kaˈbay(o)	gaˈle kaˈri(o)	deli	ˈkolo^{3} kaˈba(o)
50	breast	su^{3}	sus	ˈsu^{3}s	suh	ˈsu^{3}s
51	heart	lo^{21}y	ay pu(o)	paˈpyo^{3}	ay pu	ˈga^{3} kaˈpyo
52	liver	ta^{21}y	a) kaˈmokoto (lit.) b) lu(o) (seat o.emotion)	ˈlati^{12}	---not recorded---	ˈlati^{3} (lit.) / ˈlo^{3}n (seat of emotion)
53	drink	n-ani^{21}m	l-iˈnim	ˈw-ini^{3}m	l-enim	ˈw-ini^{3}m

	English	Matbat	Biga	Misool Maˈya	Butleh (Fiawat)	Salawati Maˈya
54	eat a) intr. b) tr.	a) n-a^{21}pon b)n-a^{21}	a) l-aˈpon b) l-a	a) w-aˈpo^{12}n b) w-a	a) l-aw b) l-a	a) w-aˈpo^{12}n b) w-a
55	bite	n-a^{21}t	l-aˈut	w-akaˈo^{12}t	l-ewot	w-akaˈo^{12}t
56	see	n-e^{3}ŋ/na^{21}w	l-em	ˈw-e^{12}m	l-em / l-ehton	ˈw-e^{12}m
57	hear	no^{41}ŋ	doˈno	ˈdo^{12}n	l-ehdon	ˈdo^{12}n
58	know	n-u^{21}n	l-un(o)	ˈw-un(o)	l-un	ˈw-un(o)
59	sleep	n-e^{41}n	l-eˈnef	ˈw-ene^{12}f	l-ene	ˈw-ene^{3}f
60	die	ma^{12}t	mat	ˈma^{12}t	mat	ˈma^{12}t
61	swim	la^{3}s	l-as	ˈw-a^{12}s (< Matbat?)	l-ah	w-aˈu^{3}n
62	fly	ni^{1}p	l-oˈbo	ˈw-opo^{12}	l-op	ˈw-opo^{3}
63	walk	bo^{21} (cl. III)	tag	ˈda^{12}g	ta	ˈda^{12}k
64	come	bo^{3}t (cl.IV)	bot	ˈbo^{3}t	but	ˈbo^{3}t
65	lie down	--- unknown ---	--- unknown ---	--- unknown ---	--- unknown ---	w-akaˈlyo^{3}
66	sit	ho^{121}l (cl. IV)	l-aˈbay	ˈsolo^{12}n	l-ebay	ˈsolo^{3}n
67	stand	n-o^{12}l	l-aˈwul	ˈw-oso^{12}l	l-ohol	ˈw-oso^{3}l
68	give	be^{21} (cl. III)	ten(o)	ˈbe(o)	bi	ˈbe(o)
69	say	fu^{21}	ˈbitin(o)	ˈbas(o)	l-ewe	ˈbas(o)
70	sun, day	la^{121}	maliˈti	ˈlyasa^{12}n	yahan	ˈlasa^{3}n
71	moon	na^{41}	pit	ˈpi^{12}t	pit	ˈpi^{12}t
72	star	kamo^{12}w	kalaˈmo	toˈi^{12}n	tun	tuˈi^{3}n
73	water	yi^{41}	wey	ˈwaya^{12}	Wey	ˈwaya^{3}
74	rain	na^{1}	dim	ˈgoli^{12}m	ɟelum	ˈguli^{3}m
75	stone	pa^{12}t	kaˈpat	kaˈpa^{12}t	epat	kaˈpa^{12}t
76	sand	ye^{3}n	len	ˈle^{12}n	len	ˈle^{12}n

	English	Matbat	Biga	Misool Maˈya	Butleh (Fiawat)	Salawati Maˈya
77	ground	ba^{3}t	gaˈgu	ˈba^{12}t	bəla	ˈba^{12}t
78	cloud	ya^{12}ŋ	met	ˈme^{12}t	mit	ˈme^{12}t
79	smoke	ba^{21}ŋ	kaˈplas	ˈla^{12}s	eplah	ˈla^{12}s
80	fire	ya^{3}p	lap	ˈla^{12}p	lap	ˈla^{12}p
81	ashes	sapa^{41}nsi / samyo^{41}ypu	kaˈlap	gaˈla^{12}p	alap	gaˈla^{12}p
82	red	ka^{3}la^{3}n	maˈme	maˈme^{12}	meme	maˈme^{3}
83	green/blue	bla^{12}w	baˈla	maˈla^{3}	melaw	maˈla^{3}
84	yellow	flu^{12}ŋ	kameniˈnis	kameˈnini^{3}s	menenih	kaˈmini^{3}s
85	white	bu^{3}	maˈbus	ˈbu^{3}s	mehbuh	ˈbu^{3}s
86	black	kabi^{12}t	maˈbis	matˈmete^{12}m	mehbih	matˈmete^{3}m
87	night	ka^{1}m	maŋˈgam	maˈle^{12}	melim	maˈle^{12}
88	hot	pla^{12}	biˈnis	ˈbini^{12}s	benih	ˈbini^{3}s
89	cold	lo^{12}t	kabuˈtu	kaˈbloti^{12}	eblut	kaˈbluti^{3}
90	full	fo^{3}n	fon	ˈfo^{12}n	fon	ˈfo^{12}n
91	new	wa^{3}w	galaˈwa	galaˈwa^{12}	dewaw	galaˈwa^{12}
92	good	fi^{3}	fi	ˈfi^{3}	fiy	ˈfi^{3}
93	round	sapu^{41}lu^{12}y	baybuˈlu	balˈbuli^{3}	popohul	kasˈpupu^{3}l
94	dry	mo^{12}w	magiˈhi	ˈmete^{12}n	meten	ˈmete^{3}n
95	no a) no, b) not	a) do^{21}po b) po^{21}	saˈpo	saˈpo^{12}	a) hanpo b) po	saˈpo^{12}
96	kill	bu^{3}n	bun	ˈbu^{3}n	bun	ˈbu^{3}n
97	burn a) intr. 3S b) trans.	a) pa^{3}n b) ta^{21}m	a) n-aˈmat b) l-agiˈnim	a) ny-ˈama^{12}t b)waˈgini^{3}m	b) l-eʔlah	a) ny-ˈama^{3}t

	English	Matbat	Biga	Misool Maˈya	Butleh (Fiawat)	Salawati Maˈya
98	road	ma^{41}	liˈlin	ˈlili^{12}n	lelin	ˈlili^{3}n
99	mountain	he^{3}l	yel	ˈye^{3}l	deɟal	ˈye^{3}l
100	name	na^{21}n	nan	ˈnasa^{12}n	nahan	ˈnasa^{3}n
101	shoulder	ba^{12}ŋ	pakaˈdi(o)	kaˈpya kaˈri(o)	eˈpa ri	kaˈpya kaˈri(o)
102	lip	pata^{21} me^{21}y	saˈmo kaˈin(o)	ˈgal kaˈin(o)	hemo eney	ˈgal kaˈin(o)
103	a) finger / b) toe / both	ŋa^{21}l	a) kaˈna ko b) kaˈi ko	ˈko^{12}p / kaˈne ˈkop(o)	eme kop	kaˈne ˈkop(o)
104	pig	wa^{3}w	nyok	ˈbo^{3}	bu	ˈbo^{3}
105	hole	ga^{1}w	go	kaˈle^{12}p	əlep	kaˈle^{12}p
106	a) betel leaf (M. biji sirih) b) areca nut (M. pinang)	a) na^{1}n b) mo^{41}n	a) uˈtum b) gey	a) ˈnyana^{12} b) kamaˈʃu^{3}	a) wotum	a) ˈnya^{12}n b) kamˈʃu^{3}
107	banana	ya^{3}w	tal	ˈtala^{12}	tal	ˈtala^{3}
108	house	de^{3}	um	ˈu^{3}m	now	ˈu^{3}m
109	grass	tu^{41} / kai^{12}	kaˈi	kaˈi^{3}	əyey	kaˈi^{3}
110	three	to^{3}l	tol	ˈto^{3}l	tol	ˈto^{3}l
111	four	fa^{3}t	fat	ˈfa^{12}t	fat	ˈfa^{12}t
112	five	li^{3}m	lim	ˈli^{3}m	lim	ˈli^{3}m
113	six	no^{12}m	woˈnom	ˈwono^{12}m	wonom	ˈwono^{3}m
114	wind	wu^{41} / wo^{41}	moˈro	ˈmoro^{12}	mor	ˈmoro^{3}
115	crocodile	mo^{41}k	if	ˈwi^{12}f	wih	ˈwi^{12}f
116	worm a) parasite in human b) other	a) hu^{41} b) ige^{1}y	a) u b) gaˈgu aˈmat(o)/ doloha'ya (sea worm)	a)&b) aˈgla^{12}t b) dulu'hai (sea worm)	a)eyu b)lelon	a)garaˈto^{12}l b) ˈkok ˈba^{12}t (worm earth)

	English	Matbat	Biga	Misool Maˈya	Butleh (Fiawat)	Salawati Maˈya
117	thunder	na^{1} tu^{121}	loˈlo	ˈlolo^{12}	yeʔut	ˈlolo^{3}
118	lightning	we^{41}t / be^{3}l	wayaˈban	maˈlyama^{12}n	tepyep	maˈlyaba^{3}n
119	today	la^{121} ino	manˈyan ene	ˈlyasan ne	yahan eme	ˈlasan ˈgine
120	forest	ha^{3}y lamo^{3}l ‘lit. tree interior’	ay lo ‘lit. tree interior’	ˈga^{3} ˈlol(o) ‘lit. wood interior’	ay lo ‘lit. tree interior’	ˈga^{3} ˈlol(o) ‘lit. wood interior’
121	village	nu^{3}	pnu	ˈpnu^{3}	penuw	ˈpnu^{3}
122	frog	iti^{3}k	wiŋawaˈla	kalˈwya^{12}l	ewyal	kaˈlamʃi^{3}k
123	sweat	sabo^{12}t	baˈbos	masˈmasa^{12}	mesəbot	masˈmasa^{3}/ maˈʃobo^{3}t
124	butterfly	bi^{3}mbo^{121}mpu / wa^{3}bi^{3}m	kalabuˈbun	kalaˈbyobo^{12}n	karobum	kalaˈbyobo^{3}n
125	land turtle sea turtle	sabe^{1}n fe^{31}n	a) kalaˈbin b) fin	a) kaˈnya^{12}t b) ˈfe^{3}n	a) enyat b) fin	a) ˈpe^{3}k b) ˈfe^{3}n
126	fly (insect)	kala^{12}ŋ	baˈni	waraˈle^{12}	Benyuw	waraˈle^{3}
127	snake	ko^{3}k	kok	ˈko^{12}k	ko	ˈko^{12}k
128	they	hafo^{21}	abaˈna	ˈsia	hane	ˈsia
129	wet	sano^{1}m	kaˈfya	maˈlo^{12}m / maˈlomo^{12} / taˈbya^{12}s	melom	maˈlo^{12}m
130	heavy	mo^{1}n	maˈsun	ˈmpata^{12}n	Meson	ˈpata^{3}n
131	coconut a) k.o. tree b) fruit of	a) nu^{1} b) nu^{1} i ge^{21}l	a) ni b) ni i pu(o)	a) ˈnu^{12}	a) nyuw	a) ˈnu^{3} / ˈnu^{12}
132	run	bawo^{21} (cl. III)	seˈro	ˈsiti^{12}	tit	ˈsiti^{3}
133	sago a) tree, b) food	a) le^{41}n b) ni^{12}	a) bi b) kaˈnan	a) ˈbi^{3} b) gaˈni^{3}	a) bi	a) ˈbi^{3} b) gaˈni^{3}

A.3. Wordlists collected on Waigeo: Laganyan, Wauyai, Kawe, Ambel, plus Salawati Maˈya for comparison

	English	Salawati Maˈya	Laganyan	Wauyai	Kawe	Ambel
1	I	ˈene	ˈyene	ˈyene	ˈyene	yene
2	you (sg.)	ˈawa	ˈawa	ˈawa	ˈwawa	awa
3	a) we (incl.)	a) ˈakne	a) ˈitne	a) ˈtitne	a) ˈtit(n)e / taˈfat(a)	a) isne
	b) we (excl.)	b) ˈamne	b) ˈamne	b)ˈam(n)e /amˈfat(a)	b) ˈam(n)e / amˈfata	b) amne
4	this	ˈgine	ˈgine	ˈgine	ˈgine	wane
5	that	ˈgia	gi(a)	gi(a)	ga	wapa
6	who	miˈsa	mat saˈgya ‘person what’	mat saˈgya ‘person what’	mat saˈgi ‘person what’	metapa
7	what	ˈfisa	(an) saˈgya ‘(thing) what’	(an) saˈgya ‘(thing) what’	(an) saˈgi ‘(thing) what’	letalapa
8	all	baˈʃe^{3}f	baˈsef	baˈsef	beˈsef	waybeyto
9	much	ˈmo^{12}t	ˈmot[o]	ˈmot[o]	ˈmot[o]	mabu
10	one	kaˈte^{12}m / ˈaksa / ˈsa	aˈtem	kaˈtem	aˈtem	kitem
11	two	ˈlu^{3}	lu	lu	lu	low
12	big	paˈle^{3}	paˈle	paˈle	paˈle(y)	anlal
13	long	maˈla^{12}s	baˈlah	baˈla	baˈla(w)	amaw(o)
14	small	gaˈna^{12}n	gaˈnan	gaˈnan	gaˈnan	amiŋki
15	woman	ˈpi^{3}n	pin	pin	pin	bin
16	man	ˈma^{12}n	ˈman[a]	ˈman[a]	ˈman[a]	man
17	a) person b) people	a)ˈmat b) muˈtumol(o)	a)mat b)maˈtumol(o)	a)mat b)maˈtumol(o)	a)mat b)maˈtumol(o)	met

	English	Salawati Maˈya	Laganyan	Wauyai	Kawe	Ambel
18	fish	ˈdo^{3}n	dun	dun	ˈin[i]	dun
19	bird	ˈmini^{3}	ˈmin[i]	ˈmin[i]	taˈpyop[o]	mani
20	dog	kaˈble^{3}	aˈbli	kaˈbli	aˈbli	ayi
21	louse	ˈu^{3}t	wut	wut	wut	ut
22	tree	ˈai(o)	way(o)	(ga) way(o)	way(o)	ay
23	seed	kaˈyas(o)	la(o) / aˈyah(o)	la(o)	la(o)	anantanim
24	leaf	kaˈlun(o)	aˈlun	kaˈlun	aˈlun	kokanu
25	root	kaˈwat(o)	aˈhat(o)	kaˈwat	aˈwat(o)	ekawak(i)
26	bark	ˈga^{3} kaˈin(o)	ga aˈin(o)	ga kaˈin(o)	ga aˈin(o)	ekani
27	skin a) human b) animal	a)kaˈini^{3} b)kaˈin(o)	aˈit	kaˈit	aˈit	a)&b) irip(i)
28	flesh, meat, fruit	ˈwana^{3}t	aˈwanat	kawaˈnat	awaˈnat	wanat(i)
29	blood	ˈlomo^{3}s	ˈlomoh	ˈlomo	lyaf	lomo
30	bone	kaˈbo^{12}m	aˈbom	kaˈbom	aˈbom	kabom
31	a) animal fat b) oil	a)maˈna^{3} b) maˈɟulu^{3}	a) maˈna b) maˈɟul[u]	a) maˈna	a) maˈna	a) ialew(i) b) milik
32	egg	ˈto^{12}l	ˈtol[o]	ˈtol[o]	ˈtol[o]	talo
33	horn	ˈtandu^{3} (<M.)	ˈtandu (<M.)	kaˈut kaˈsan	tanˈduk (<M.)	--- unknown ---
34	tail	kaˈyu(o)	aˈyu(o)	kaˈyu(o)	aˈyu	gale(y)
35	feather	kaˈlun(o)	apˈnuni	kapˈnun	taˈpla	kaprun
36	human hair a) head, b) body	a) ˈplya^{3} b)kaˈnyunu^{3}t	a) taˈplya b) abˈtun	a)&b) taˈpla	a) taˈpla b) gaˈtum	a)pya b) kaprun
37	head a) lit. b) fig.	a) kaˈut(o) b) kaˈu^{3}t	aˈsap(o)	kaˈut	aˈut sap(o)	kagalan

	English	Salawati Maˈya	Laganyan	Wauyai	Kawe	Ambel
38	ear	taˈna(o)	taˈna(o)	taˈna(o)	taˈna(o)	talamtum
39	eye	ˈta(o)	ta abul(o)	ta bul(o)	ta bul(o)	taɟi
40	nose	saˈgul(o)	saˈgul(o)	(kaˈnya) kaˈsum(o)	aˈnyu(o)	sun
41	mouth	ˈgal(o)	gal(o)	gal(o)	gal(o)	ga(y)
42	tooth	kaˈlif(o)	aˈlif(o)	kaˈlif	aˈlif(o)	wali
43	tongue	ˈara(o)	hal(o)	wal(o)	wal(o)	ware(y)
44	nail	kaˈsi^{3}p / kaˈʃi^{3}p	aˈseb(o)	kaˈʃeb(o)	aˈseb(o)	kabe
45	foot	kaˈne ˈpa^{12}p	aˈne kat(o)	ˈkam[a]	kat(o) / kam	katon bat
46	knee	kaˈne kaˈpuk(o)	aˈne aˈpuk(o)	kaˈne kaˈpuk(o)	kam aˈpuk(o)	tatigil (bat)
47	hand	kaˈne ˈle^{3}s	aˈne kop(o)	gil(o)	kop(o)	kapyan(i)
48	belly	ˈna(o)	aˈnyay(o)	kaˈnyay(o)	aˈnyay(o)	nyay
49	neck	ˈkolo^{3} kaˈba(o)	aˈlu aˈbay(o)	kaˈlu ˈbay(o)	aˈlu ˈlay(o)	kakon
50	breast	ˈsu^{3}s	ˈtut[u]	su	su	su
51	heart	ˈga^{3} kaˈpyo	malamˈpyu	ga kaˈpyu(o)	taˈpyuw	yoy
52	liver	ˈlati^{3} (lit.) / ˈlo^{3}n (seat of emotion)	ˈlati	b) lu (emo.)	laˈte(y)	latey
53	drink	ˈw-ini^{3}m	ˈw-inim	dum	dum	l-anum
54	eat a)intrans., b)trans.	a) w-aˈpo^{12}n b) w-a	a) w-aˈpon b) w-a	a) aˈpon b) w-a	a) aˈpon b) w-a	a) l-anan b) l-ey
55	bite	w-akaˈo^{12}t	aˈot[o]	aˈot[o]	aˈot[o]	l-asak
56	see	ˈw-e^{12}m	w-em	w-em	afˈna /w-em	l-em
57	hear	ˈdo^{12}n	ˈdon[o]	ˈdon[o]	ˈdon[o]	l-un
58	know	ˈw-un(o)	w-un(o)	w-un(o)	w-un(o)	

	English	Salawati Maˈya	Laganyan	Wauyai	Kawe	Ambel
59	sleep	ˈw-ene^{3}f	ˈw-enef	ˈw-enef	ˈw-eˈnef	l-ane
60	die	ˈma^{12}t	mat	mat	mat	la-mat
61	swim	w-aˈu^{3}n	w-ah	w-a	ˈw-un[u]	la
62	fly	ˈw-opo^{3}	ˈw-op[o]	ˈw-op[o]	ˈw-op[o]	l-apo
63	walk	ˈda^{12}k	dag	dag	dag	la-tan
64	come	ˈbo^{3}t	but	but	but	la-dok
65	lie down	w-akaˈlyo^{3}	w-abaˈlyoy(o)	aˈbloy[o] / du	du (see notes)	--- unknown ---
66	sit	ˈsolo^{3}n	toˈlon	toˈlon	toˈlon	la-katon
67	stand	ˈw-oso^{3}l	ˈw-ohol	w-ol	w-ol	l-ol
68	give	ˈbe(o)	bi(o)	bi(o)	ten(o)	la-bi
69	say	ˈbas(o)	ba	ba(o)	ba	la-bini
70	sun, day	ˈlasa^{3}n	lyaˈhan	lan	yan	laynta(y)
71	moon	ˈpi^{12}t	pit	pit	pit	to^{w}n
72	star	tuˈi^{3}n	aˈlo	tun	tun	kalo
73	water	ˈwaya^{3}	ˈway[a]	ˈway[a]	ˈway[a]	we
74	rain	ˈguli^{3}m	guˈlum	guˈlum	guˈlum	mey
75	stone	kaˈpa^{12}t	aˈpat	kaˈpat	aˈpat	katin
76	sand	ˈle^{12}n	aˈlen	len	len	layn
77	ground	ˈba^{12}t	aˈbat	kaˈbat	aˈbat	bat
78	cloud	ˈme^{12}t	met	met	met	mandep
79	smoke	ˈla^{12}s	aˈbli	kaˈbli	laˈbi	bi
80	fire	ˈla^{12}p	lap	lap	lap	lap
81	ashes	gaˈla^{12}p	gaˈlap	kaˈcuf / gaˈlap	aˈbif[i]	lagalap

	English	Salawati Maˈya	Laganyan	Wauyai	Kawe	Ambel
82	red	maˈme^{3}	talˈme	me	me	antami
83	green/blue	maˈla^{3}	maˈla	maˈla	maˈla(o)	ambyau
84	yellow	kaˈmini^{3}s	amiˈni	kamiˈni	mageniˈni	amani
85	white	ˈbu^{3}s	buh	bu	buˈsu / bu	ambu
86	black	matˈmete^{3}m	matmeˈtem	matmeˈtem	amˈgum[u]	amatem
87	night	maˈle^{12}	madyoˈrom / maˈle (“more refined”)	madyoˈrom / maˈle (“more refined”)	madyoˈrom	gam
88	hot	ˈbini^{3}s	biˈni	biˈni	biˈni	amari
89	cold	kaˈbluti^{3}	mariˈrin	mariˈrin	mariˈrin	kabyot
90	full	ˈfo^{12}n	fon	--- not recorded---	fon	anhon
91	new	galaˈwa^{12}	galˈwa	galˈwa	gaˈwa	ambabo
92	good	ˈfi^{3}	fi	fi	fi	ahey
93	round	kasˈpupu^{3}l	pampaˈlan	kawuˈli	awuˈli	aŋkapupur
94	dry	ˈmete^{3}n	meˈten	meˈten	meˈten	ame
95	no a) no, b) not	saˈpo^{12}	haˈpo	po	po	po
96	kill	ˈbu^{3}n	bun	bun / falˈpun	bun	buni
97	burn a) intr. 3S b) trans.	a) ˈny-ama^{3}t	a) nyaˈmat b) fanamat	a) nyaˈmat b) w-asaˈblay	a) nyaˈmat b) aˈblay	a) anan b) l-asabyay
98	road	ˈlili^{3}n	liˈlin	--not recorded--	liˈlin / taˈtel[e]	can (path)
99	mountain	ˈye^{3}l	woˈlon / yil	yil	yil	il
100	name	ˈnasa^{3}n	naˈhan	nan	nan	gayn
101	shoulder	kaˈpya kaˈri(o)	aˈpya pop(o)	kaˈpya pop(o)	aˈpya aˈpli(o)	pupun
102	lip	ˈgal kaˈin(o)	gal aˈit(o)	gal kaˈit(o)	gal aˈit(o)	kanin

	English	Salawati Maˈya	Laganyan	Wauyai	Kawe	Ambel
103	a) finger / b) toe / both	kaˈne ˈkop(o)	aˈne aˈcay(o)	kaˈcay(o)	a) kop aˈut[u] b) kat aˈut[u]	katontin
104	pig	ˈbo^{3}	bo	bo	maˈre(y)	kayaw
105	hole	kaˈle^{12}p	aˈlep[e]	kaˈlep[e]	lop	dokow
106	a) betel fruit (M. *biji sirih*) b) areca nut (M. *pinang*)	a) ˈnya^{12}n b) kamˈʃu^{3}	a) nyan[a] b) amˈcu	a) nyan[a] b) kamˈcu	a) ˈnyana b) maˈcu	a) nyan b) ɟey chalk: ahar
107	banana	ˈtala^{3}	ˈtal[a]	ˈtal[a]	ˈtal[a]	tal
108	house	ˈu^{3}m	wum	wum	um	now
109	grass	kaˈi^{3}	aˈnyum[u]	kaˈi	aˈi	abris (< Biak)
110	three	ˈto^{3}l	tul	tul	tul	tul
111	four	ˈfa^{12}t	fat	fat	fat	ɸat
112	five	ˈli^{3}m	lim	lim	lim	lim
113	six	ˈwono^{3}m	woˈnom	woˈnom	woˈnom	wanom
114	wind	ˈmoro^{3}	ˈmor[o]	ˈmor[o]	ˈmor[o]	moro
115	crocodile	ˈwi^{12}f	wif	yif	aŋˈgaf	laŋkaway
116	worm a) parasite in human, b) other	a)garaˈto^{12}l b) ˈkok ˈba^{12}t (worm earth)	a)&b) gaˈlah ˈtol[o]	a)&b) gaˈlat ˈlol[o]	a)&b) galaˈtol[o]	a) kaci b) baɟolow
117	thunder	ˈlolo^{3}	ˈlol[o]	ˈlol[o]	ˈlol[o]	lalo
118	lightning	maˈlyaba^{3}n	labˈleb	labˈleb	malyaˈman	lalew
119	today	ˈlasan ˈgine	lyahaˈŋin	lan ˈgine	yan gin	lanyan wane
120	forest	ˈga^{3} ˈlol(o) ‘lit. wood interior’	ga lol(o) ‘lit. wood interior’	ga lol(o) ‘lit. wood interior’	ga lo ‘lit. wood interior’ / aˈre lo	ay lo(y) ‘lit. tree interior’

	English	Salawati Maˈya	Laganyan	Wauyai	Kawe	Ambel
121	village	ˈpnu^{3}	nu	nu	nu	kaliw
122	frog	kaˈlamʃiˈ^{3}k	kataˈyal[a]	katˈwal[a]	akcoˈrok	maŋkyaw
123	sweat	masˈmasa^{3}/ maˈʃobo^{3}t	manyoˈbot	manyoˈbot	manyoˈbot	mabot
124	butterfly	kalaˈbyobo^{3}n	abyoˈbon	kamlaˈmar	abyoˈbon/ labyoˈbon	kababat
125	land turtle sea turtle	a) ˈpe^{3}k b) ˈfe^{3}n	a) big b) fin	a) atˈbig b) fin	a) atˈbig b) fin	a) maŋgin b) ɸen
126	fly (insect)	waraˈle^{3}	laˈle	deˈle	deˈle	lan
127	snake	ˈko^{12}k	kok	kok	kok	lemat
128	they	ˈsia	ˈhia	haˈfat(a) / ˈsia	haˈfat(a) / ˈsi(a)	sia
129	wet	maˈlo^{12}m	baˈlom[o]	baˈlom[o]	baˈlom[o]	amasut
130	heavy	ˈpata^{3}n	mpaˈtan / maˈʃon[o]	ampaˈtan	apyaˈtan	amon
131	coconut a) k.o. tree b) fruit of	ˈnu^{3} / ˈnu^{12}	nu	--not recorded--	nu	a) ko^{w}t b) ko^{w}t i kapyuy
132	run	ˈsiti^{3}	ˈtit[i]	ˈtit[i]	ˈtit[i]	l-ati
133	sago a) tree, b) food	a) ˈbi^{3} b) gaˈni^{3}	a) bi b) gaˈni	a) bi b) gaˈni	a) bi b) gaˈni	a) bey b) cun

Appendix B Grammar notes on some Raja Ampat languages

B.1. In general – morphological encoding in RA languages

In this Appendix I present some grammar notes on the languages and dialects of which wordlists have been presented in Appendix A. Most notes deal with morphology. All of these languages/dialects feature the following two instances of morphological encoding. First, in all of these languages, most verbs take a prefix marking agreement in person and number with the subject. Second, names of inalienable body parts and kinship terms take an affix referring to the possessor. The possessive marking morpheme takes different forms in the various RA languages. While in most languages it involves a suffix, it additionally involves tone loss in the Salawati and Misool dialects of Ma'ya, and a prefix in Ambel. In Matbat, it involves both an infix and tone loss.

Both of the above-mentioned types of morphological encoding have also been reported for other SHWNG languages: subject-agreement marking inflection on verb has been reported for Biak (Steinhauer 1985) and Taba (Bowden 1997). The possessive marking on inalienable body parts and kinship terms has been reported for Sawai (Whisler 1992) and Biak (Steinhauer 1985).

A surprising find was the morphological encoding of aspect in Ambel (2nd person singular only). This is a clear indication of Papuan influence.

B.2.Wordlists of RA languages – language-specific notes

B.2.1. Notes on Matbat wordlist

Dialect & village: Mage village, same dialect as Kapacol.
Native speakers: Charlotta Jemput (30) and Absalom Jemput (20).
Date: March 2000.

Note: Apart from the extended Swadesh-list in appendix A, I also collected a larger 850 wordlist. Absalom Jemput translated this list on his own, and I checked about 1/3 of it with him, among others to add the tones. The following notes on morphological phenomena in Matbat are mostly based on the larger list, and some examples have been taken from that wordlist.

B.2.1.1. Segmental phonology

The consonant phonemes of Matbat are listed in Table B.1. On the whole, this consonant inventory does not stand out among Austronesian languages. The absence of the phoneme /r/ does not come as a surprise – the absence or low distinctive load of a rhotic is a key feature distinguishing a South Halmahera language from a West New Guinea language (Blust 1978). The phoneme /y/ (IPA /j/) is most often realized as a semivowel, but has voiced obstruent [ɟ] and fricative [ʝ] allophones in syllable initial position, and the variation between these allophones is free.

Table B.1: Inventory of the consonantal phonemes of Matbat.

	Labial	**Alveolar**	**Velar**	**Glottal**
Voiceless stops	p	t	k	
Voiced stops	b	d	g	
Voiceless fricatives	f	s		h
Nasals	m	n	ŋ	
Lateral		l		
Semivowels	w	j		

Matbat has a five-vowel system /i,e,a,o,u/. Both semivowels occur after vowels, and then they are phonetically diphthongs. Weak (= toneless) vowels /o/ and /e/ may centralize considerably, so that they are sometimes hard to distinguish from weak /a/ and vice versa. For example, /sapu^{41}lu^{12}y/ 'round' might have been transcribed alternatively as /sepu^{41}lu^{12}y/, and /bawo^{21}/ 'to run' as /bowo^{21}/.

The tones of Matbat have been discussed in Chapter V.

B.2.1.2. Morphology – subject-agreement on verbs

Among Matbat verbs, four classes can be distinguished on the basis of the subject-agreement marking inflexion they take:

Class I — Verbs whose stem begins with a vowel. For example, /n-ani^{21}m/ 'to drink', /n-o^{12}l/ 'to stand' or /n-e^{41}n/ 'to sleep'. The prefixes they take are listed in Table B.2.

In addition, there are three classes of verbs whose stem begins with a consonant. If these stems would take the same onset consonants as prefixes, this would result in complex onsets, which is what actually happens in Taba (Bowden 1997) and in Ma'ya (see Table VI.6), two other RASH languages featuring the same type of verbal inflection. In Matbat, however, complex onsets appear much less frequently. Such onsets are avoided by various strategies, on the basis of which these three verb classes can be distinguished:

Class II — This verb class comprises consonant-initial verbs stems that do not take a prefix: e.g. /fu^{21}/ 'to say', /no^{41}ŋ/ 'to hear', /la^{3}s/ 'to swim', /faso^{12}y/ 'to rest'.

Class III The stems of verbs of class III have the initial onset consonant /b/. These verbs take some of the subject-agreement marking prefixes. E.g. /bawo^{21}/ 'to run', /bo^{21}/ 'to walk', /bo^{3}t/ 'to come, to arrive'. These verbs take a prefix /k/ for 1st sg. and /t/ for 1st pl. incl. (cf. class I) . In the wordlist, they are followed by the note '(cl. III)'.

Class IV Class IV comprises verbs beginning with the consonant /h/, which take subject-agreement marking prefixes in the 1st person only. E.g. /ho^{121}l/ 'to sit', /ha^{3}/ 'to rise, to climb', /hu^{3}ŋ/ 'to enter', /ho^{3}y/ 'to return'. These verbs take a prefix /s/ for 1st sg. and for 1st pl. inclusive. In the wordlist they are followed by the note '(cl. IV)'.

Table B.2: Matbat personal pronouns and verbal paradigms.

	Pronoun	**Class I**	**Class II**	**Class III**	**Class IV**
1st sg.	ya^{21}k	k-e^{41}n	fu^{21}	k-awo^{21}	s-o^{121}l
2nd sg.	ya^{21}w	m-e^{41}n	fu^{21}	bawo^{21}	ho^{121}l
3rd sg.	hi^{21}	n-e^{41}n	fu^{21}	bawo^{21}	ho^{121}l
1st pl. incl.	ya^{21}t	t-e^{41}n	fu^{21}	t-awo^{21}	s-o^{121}l
1st pl. excl.	ya^{21}m	n-e^{41}n	fu^{21}	bawo^{21}	ho^{121}l
2nd pl.	mi^{21}n	m-e^{41}n	fu^{21}	bawo^{21}	ho^{121}l
3rd pl.	hafo^{21}	n-e^{41}n	fu^{21}	bawo^{21}	ho^{121}l

B.2.1.3. Morphology – names of inalienable body parts and kinship terms

As mentioned above, names of inalienable body parts and kinship terms take an affix referring to the possessor. The wordlist in Appendix A contains a number of names of body parts, but no kinship terms. Not all body parts are inflected – for example, both /te^{121}lo/ 'head' and /para^{12}l/ 'tongue' are not. Table B.3 illustrates the realization of this inflection of body parts for /maba^{21}y/ 'nose', /ŋa^{21}bin/ 'ear', /sabo^{21}m/ 'back (of body)'. In contrast with Ma'ya and Sawai, the possessive inflection on body parts in Matbat is not a suffix but an infix. The segmental morpheme is a nasal, and there is a change in the tone pattern in the third person (cf. Ma'ya). The vowel alternation, on the other hand, is reminiscent of Sawai, where the possessive inflection of body parts and kinship terms involves vowel fronting in 1st and 2nd singular. In the wordlist, inflecting body parts have been rendered in the 3rd person. For the 1st plural exclusive, my data are inconclusive as to whether the correct form is identical to the 2nd plural, the 3rd plural, or whether both forms are correct.

Table B.3: Matbat paradigms for possessive inflection on body parts.

	/maba^{21}y/ 'nose'	**/ŋa^{21}bin/ 'ear'**	**/sabo^{21}m/ 'back'**
1st sg.	mo^{3}ŋba^{21}y	ŋa^{21}ŋbin	si^{3}ŋbo^{21}m
2nd sg.	mo^{3}mba^{21}y	ŋa^{21}mbin	si^{3}mbo^{21}m
3rd sg.	maba^{21}y	ŋa^{21}bin	sabo^{21}m
1st pl. incl.	mo^{3}nba^{21}y	ŋa^{21}nbin	si^{3}nbo^{21}m
1st pl. excl.	mo^{3}mba^{21}y	ŋa^{21}mbin	si^{3}mbo^{21}m
	/maba^{21}y	/ŋa^{21}mbin	/sabo^{21}m
2nd pl.	mo^{3}mba^{21}y	ŋa^{21}mbin	si^{3}mbo^{21}m
3rd pl.	maba^{21}y	ŋa^{21}bin	sabo^{21}m

B.2.2. Notes on Biga wordlist

Village of speaker: Biga.
Native speakers: Christian Samigita
Date: February 2000.

B.2.2.1. Phonology

Biga may well feature a tone contrast with a limited lexical load: for example /ka^{l}i/ 'grass' is different from /ka^{l}i/ 'leg' in that the former has a higher pitch. Also, a word like /bi/ 'sago (tree)' is produced with a high pitch.

A considerable number of words have an epenthetic final vowel /o/ in prepausal position. In the wordlist, the epenthetic final /o/ appears between brackets.

B.2.2.2. Morphology

The verbal paradigm is illustrated in Table B.4.

Table B.4: Biga personal pronouns and verb inflection.

	Pronoun	**/-inim/ to drink**
1st sg.	in	y-inim
2nd sg.	awa	m-inim
3rd sg.	num	n-inim
1st pl. incl.	itbana	t-inim
1st pl. excl.	ambana	m-inim
2nd pl.	mimbana	m-inim
3rd pl.	abana	l-inim

B.2.3. Notes on Salawati Ma'ya wordlist

Village of speakers: Samate
Native speakers: Hud Arfan (55), Abu Saleh (42), Miriam Mayalibit (30), Ainun Mau (35).
Date: April 1999.

B.2.4. Notes on Fiawat wordlist

Village of speaker: Fiawat. Administratively, this village is part of the village unit (M. *desa*) Samate. This village moved from the Wayjan River to the coast in 1960, first settling in Waisamtepop, later moving to Samate in 1970. In 1984 more than half of the village joined the Kalobo transmigration camp. There are 150 to 200 people in this village. Children and young adults no longer speak the language of the older part of the population. Fiawat is one of the interior-oriented villages of Salawati. The language situation of these villages is unclear (see § II.3.5).
Native speaker: Moses Aibah (54)
Date: February 2000.

B.2.4.1. Morphology

The verb prefixes are illustrated in Table B.5. There is (at least) one other verb class, which has the stem unchanged in the 3rd plural, and inflection in some other forms: /hane bi/ 'they give' but /in yebyi/ 'I give'; likewise /hane tit/ 'they run' but /in yecit/ 'I run'.

Table B.5: Fiawat personal pronouns and verb inflection.

	Pronoun	**/lenim/ 'drink'**
1st sg.	in(e)	y-enim
2nd sg.	aw(a)	m-enim
3rd sg.	ia	n-enim
1st pl. incl.	atne	t-enim
1st pl. excl.	ame	l-enim
2nd pl.	mihya	m-enim
3rd pl.	hane	l-enim

B.2.5. Notes on Misool Ma'ya wordlist

Village of speakers: Fafanlap.
Native speakers: Kaidat Soltip (66), Muhammaddin Soltip (60), Muhammad Noh Soltip (55)
Date: April 1999, February 2000.

B.2.6. Notes on Kawe wordlist

Village of speakers: Selpale.
Native speakers: Korinus Ayelouw (56), Dirk Ayey (60)
Date: March 2000.

B.2.6.1. Phonology

As mentioned above, all Maˈya dialects feature an epenthetic final /-o/ on words that carry the Fall toneme, when they appear in utterance-final position. In the wordlist this vowel is transcribed between round brackets.

Secondly, in Kawe and also in the other two Waigeo dialects (Laganyan and Wauyai) penultimate-stressed polsyllabic words that end in an open syllable lose the final vowel in sentence-medial context. In § II.3.1.2.2, I have argued that this is a case of apocope (final vowel deletion) rather than paragoge (final vowel epenthesis). The apocopated vowel is transcribed between rectangular brackets, e.g. ˈtal[a] 'banana'.

B.2.6.2. Morphology - verb classes

There are (at least) three verb classes. The members of the first class have a stem beginning in a vowel and take a subject-agreement marking prefix, as illustrated by the examples in Table B.6. Other verbs have an consonant onset as part of their stem, but take inflection in some forms: e.g. /ten(o)/ 'to give' has /cen(o)/, /mcen(o)/ and /ncen(o)/, for the 1st, 2nd, and 3rd person singular, respectively, but /ten(o)/ in the 3rd plural. Likewise for /toˈlon/ 'to give' (1st sg. /coˈlon/), /ˈtit[i]/ 'to run' (1st sg. /ˈcit[i]/), and /mat/, 'to die' (1st sg. myat/). Finally, there is a class of verbs whose stem remains unaffected by the subject agreement prefix: /aˈot[o]/ 'to bite', /aˈpon/ 'to eat (intr.)'. These verb classes are the same as the ones distinguished by van der Leeden on the basis of evidence from for Salawati and Misool Maˈya (ms. 2 – see Table VI.6).

Interestingly the verb /du/ 'to lie down' appears to be conjugated both with a subject pronoun and with the same pronoun probably serving as a reflexive: /ˈyene ˈɟu-yene/, /ˈia ˈnɟu-ya/, /ˈsia du-si/ for 1st sg., 2nd sg. and 3rd pl., respectively.

Table B.6: Kawe Maˈya personal pronouns and verbal paradigms

	Pronoun	**/ˈwun[u]/ 'swim'**	**/ˈwop[o]/ 'fly'**
1st sg.	ˈyene	ˈy-un[u]	ˈy-op[o]
2nd sg.	ˈwawa	ˈmy-un[u]	ˈmy-op[o
3nd sg.	ˈia	ˈny-un[u]	ˈny-op[o]
1st pl. incl.	ˈtit(n)e / taˈfat(a)	ˈt-un[u]	ˈt-op[o]
1st pl. excl.	ˈam(n)e / amˈfat(a)	ˈw-un[u]	ˈw-op[o]
2nd pl.	ˈmia	ˈm-un[u]	ˈm-op[o]
3rd pl.	ˈsi(a) / haˈfat(a)	ˈw-un[u]	ˈw-op[o]

B.2.7. Notes on Wauyai wordlist

Village of speaker: Wauyai.
Native speaker: Musa Galipin (53)
Date: March 2000.

Verbal prefixes for subject agreement of the Wauyai dialect are the same as those in the Kawe dialect (see Table B.6). The distinction of verb classes made for the Kawe dialect is also relevant for the Wauyai dialect.

B.2.8. Notes on Laganyan wordlist

Village of speakers: Lupintol
Native speaker: Sagir Kasyan (58)
Date: March 2000.

Verbal prefixes for subject agreement of the Laganyan dialect are the same as those in the Kawe dialect (see Table B.6).

B.2.9. Notes on Ambel wordlist

Dialect & village of speaker: Metnyo dialect, Wayfoy village.
Native speaker: Hengky Gaman (40)
Date: March 2000 – recorded in Sorong.

B.2.9.1. Phonology

The language definitely does not feature lexical tone. It probably does feature lexical stress, but this is not marked in this wordlist.

The labial fricative is a bilabial /ɸ/ rather than a labiodental /f/.

A number of words have an epenthetic segment in prepausal position, which is realized as /-i/ following a consonant and as /-y/ after a vowel. E.g.: /sia labini layntay/ 'they say sun', but /sia labini laynta po/ 'they do not say sun.' Similarly, other words have an epenthetic vowel /-o/ in prepausal position. In the wordlist, the epenthetic /-i/, /-y/ or /-o/ appears between round brackets, so irip(i) 'skin', laynta(y) 'sun', amaw(o) 'small'.

B.2.9.2. Morphology – verbs

Personal pronouns and some verbal paradigms are listed in Table B.7. Probably this list is not exhaustive. Some verb roots do not take subject agreement prefixation – e.g. /la/ 'to swim'. In the wordlist, the position of the hyphen indicates the boundary between prefix and stem, just as it does in the examples in Table B.7.

Table B.7: Ambel personal pronouns (Pron.) and verbal paradigms. For the second singular, all verbs are listed with the perfective morpheme.

	Pron.	**/lanum/ 'drink'**	**/lem/ 'see'**	**/lol/ 'stand'**	**/labi/ 'give'**	**/labini/ 'say'**
1st sg.	yene	y-anum	y-em	y-ol	ɟi	ɟini
2nd sg.	awa	ny-anum	ny-em	ny-ol	nɟi	nɟini
3rd sg.	ia	n-anum	n-em	n-ol	mbi	mbini
1st pl. incl.	isne	t-anum	t-em	t-ol	bi	bini
1st pl. excl.	amne	am-anum	am-em	am-ol	am-bi	am-bini
2nd pl.	mewa	m-anum	m-em	m-ol	mem-bi	mem-bini
3rd pl.	sia	l-anum	l-em	l-ol	la-bi	la-bini

Apart from the subject-agreement distinction, there also appears to be encoding of aspect. I only found evidence for this in the 2nd sg. While /ny-/ encodes perfective aspect (in the 2nd singular), /m-/ encodes imperfective. This is illustrated by the examples in (1) and (2). More research is needed to confirm this find, and, if it stands up to scrutiny, to see whether similar contrasts exist in other forms than the 2nd sg. .

(1) awa ny-em metapa
PRS2S 2SPERF-see who

Whom have you seen? / Whom did you see?

(2) awa m-em metapa
PRS2S 2SIMPERF-see who

Who is it that you have not seen yet?

B.2.9.3. Morphology – inalienable nouns

Table B.8 illustrates the affixes encoding possessor-agreement on names of inalienable body parts and kinship terms.

Table B.8: Ambel paradigm for possessive inflection on body parts.

	/taɟi/ 'eye'
1st sg.	taɟi-k
2nd sg.	taɟi-m
3rd sg.	taɟi
1st pl. incl.	taɟi-ni
1st pl. excl.	am-taɟi-ni
2nd pl.	mem-taɟi-ni
3rd pl.	taɟi-ni

Appendix C Social situation and history of the Raja Ampat archipelago

C.1. The social situation of the Raja Ampat archipelago

C.1.1. Introduction – land- and sea-oriented groups

The population density of the Raja Ampat archipelago is very low, at 35,338 people (Sorong in Numbers 1998).[66] On each of the three major islands (Waigeo, Salawati and Misool), there are up to twenty small villages, spread out over the coastline. The size of the population of each village ranges between 100 to 850 people. Nowadays, the interiors of the islands are mostly uninhabited, although some groups regularly go inland for various days to harvest sago, the staple carbohydrate for the whole RA population, or for hunting.

In an ethnographic study on the RA islands based on first-hand data, de Clercq (1893) draws a clear distinction between a sea-oriented population and a number of groups living in the interior of the islands. Among the groups living in the interior, but not for the coastal population, de Clercq distinguishes different tribes, namely the Ambel of east Waigeo and the "mountain-dwellers (my translation)" of Salawati and Misool (de Clercq 1893).

Nowadays all groups that used to live in the interior have moved to the coast. The distinction between land- and sea-oriented groups, however, is still most useful, because it allows us to distinguish and explain the primary socio-cultural division within the original population of the RA archipelago. Table C.1 illustrates how the sea- and land-oriented groups show a markedly different pattern in function of some important sociological factors.

[66] By *kecamatan* (= district): North Waigeo: 5,590; South Waigeo: 7,922; Samate (northern Salawati and Batanta): 7,154; Seget (South Salawati and a coastal section of the New Guinea mainland across from Salawati): 6,212; Misool: 8,460 (Sorong in Numbers 1998).

Table C.1: Overview of sea- and land-oriented groups of the Raja Ampat archipelago in function of a number of socio-cultural factors.

Factor	Sea-oriented (Ma'ya)	Land-oriented (various groups)
Religion	Muslim	Christian since mid 20th century
Village location	Have lived on the coast since mythical times	Lived in interior until mid 20th century
Main economic activity	Fishing	Produce sago, also for sea-oriented people
Contacts outside RA	Trade with Moluccas; vassals of Tidore sultanate	Hardly any, until move to coast
Physical appearance	Mixed Austronesian-Papuan type. Considerable within-group variation	Papuan type (dark skin, frizzy hair, big nose)
Language	Ma'ya	Various RA languages
Mythology	Myth of Waigeo origin	Local origin myths

The sea- and land-oriented populations themselves are consciously aware of the difference between them. For example, the Matbat, a land-oriented group of Misool, contrast *mat low* 'people of the sea', a label from the Ma'ya, with *mat ley* 'landward people', a label they use for themselves.

C.1.2. The Ma'ya

The sea-oriented population of Waigeo, Salawati and Misool are known in the literature as the Ma'ya (Polansky 1957, Smits & Voorhoeve 1992, van der Leeden 1993). While this label is known in some Ma'ya villages, it is not in others, where the Ma'ya refer to themselves in Malay as *orang Raja Ampat* 'Raja Ampat people'.[67] But although members of the sea-oriented group do not consistently refer to themselves as a group, they share a number of features among themselves, and these features set them apart from the various interior-oriented groups.

Generally accepted in the Raja Ampat archipelago is a migration myth, which says that the Ma'ya of Waigeo, Salawati and Misool have a common origin in west Waigeo, on the north shore of Kabui Bay. The following account summarizes the myth as it was presented by a Ma'ya from Samate to van der Leeden (1989). The

[67] LEMAKAF, the society of original Raja Ampat islanders (see § C.2.3.3), uses the word Ma'ya to refer to the original Raja Ampat population as a whole, that is, both the sea-oriented and the land-oriented groups, but excluding migrants from outside, such as the Beser people from Biak, the Butonese, etc.

myth tells the story of a woman who finds 7 eggs. She takes them home, where, after a while, the eggs hatch: out of them come the ancestors of the four *raja* dynasties of the *Raja Ampat* 'four *raja*' archipelago: the *rajas* of Waigeo, Salawati, east Misool and west Misool / Kilimuri.[68] Out of the three other eggs come a ghost, a woman, and a stone, the latter being the youngest of the seven siblings from the eggs. After an argument, the four brothers decide to move away from one another, each going with their followers to the area where they and their offspring would become the rulers. The stone decided to stay in Waigeo, to mark the location of their origin. This stone is housed now in a small shrine, and it is venerated by the Ma'ya, both from Waigeo and from the other islands. Nobody knows where the ghost went, according to the myth. The woman, Pintake, had moved from Waigeo before the brothers left, expelled because she was pregnant. She moved to Biak, and her son was the mythical hero Gurabesi, who fought for the sultan of Tidore and married his daughter as a reward. A number of versions exist of this myth, and the differences between variants have to do with the relative importance of the participants.[69]

The myth of the Waigeo origin of the Ma'ya probably reflects historic truth, because the Ma'ya villages on Waigeo, Salawati and Misool speak the same language (see § II.3.1). In Indonesian, the people of the RA area refer to the Ma'ya language as *bahasa Raja Ampat* 'the language of the Raja Ampat archipelago'. Strictly speaking, this label is incorrect, as there are other original RA languages. It is correct, on the other hand, in the sense that this language is the native language of Ma'ya villages all over the RA archipelago. Also, in communication with the interior-oriented groups, it is the latter who switch to Ma'ya, so that the language functions as a lingua franca. Nowadays, with the substantial influx of migrants from outside in the RA area, Malay is taking over this function from Ma'ya.

The main economic activity in the Ma'ya villages is fishing, for their own consumption, and sometimes also for selling in Sorong, the regional capital on the New Guinea mainland. The main carbohydrate is sago, produced from the interior of the sago tree. On Salawati and Misool, the Ma'ya hardly produce sago themselves, but buy it from neighboring interior-oriented villages. The reason for this situation will be discussed below.

Traditionally, all original Raja Ampat groups built their houses on poles. When the villages were constructed on the coast or near a river, they were built on the water; otherwise they were built on poles above the ground. This is clearly

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[68] According to the versions of the myth in van der Leeden (1989) and in Kamma (1948), the fourth brother became *raja* of Kilimuri on the south coast of Seram. The *raja* of west Misool, residing in Waigama was appointed later by the sultan of Tidore.

[69] For example, among the Ma'ya of the west coast of Waigeo, the Kawe, I collected a variant which relates the four kings to the Kawe area. In what is probably a Biak version of this myth (Kamma 1948), the sequence of events is the reverse, and now it is Gurabesi – with an unambiguous Biak identity – and his Tidore princess who find the eggs out of which the *rajas* are born. This version implies that the RA *rajas* have a forefather from Biak. The version in de Clercq (1893) has Gurabesi as the biological father of the four *rajas*.

illustrated on a detailed map of Salawati in Polansky (1957). Nowadays, at least one Ma'ya village, Fafanlap, is still on poles above the water, and Sailolof may be as well.

Until the Dutch colonial government became more actively involved in New Guinea in the course of the 20th century, the Raja Ampat islands were dominated for at least 400 years by the North-Moluccan sultanate of Tidore. The leading clans in the Ma'ya villages were his vassals: there were the 4 *rajas*, of Waigeo, Salawati (residing in Samate), west Misool (residing in Waigama) and east Misool (residing in Lilinta), and also dignitaries distinguished with the slightly lesser title of *kapitan laut* – lit. 'fleet commander'– in the villages Sailolof and Fafanlap, on Salawati and Misool, respectively. Each of these paid a yearly tribute to the sultan, and contributed vessels and men to the *hongi*, the fleet that raided western New Guinea for tribute and slaves (Miedema 1984, Huizinga 1998). Apart from Tidore, the Ma'ya villages were connected in a network of trading and raiding with much of the Moluccas, and with the Bird's Head area of western New Guinea (Huizinga 1998, Goodman 1998).

An important consequence of the Moluccan contacts of the Ma'ya was the introduction of islam: in the RA archipelago, only the Ma'ya villages are muslim. There does not appear to be a single source from where islam was brought in. According to sources in the village Fafanlap, islam reached Misool from the Banda islands in the Central-Moluccas. In the Ma'ya village of Lupintol in Waigeo, people mention Tidore as the source from where they received islam. It is well known that muslim traders have played an important role in the spread of islam in the eastern part of the Malay archipelago (Hanna and Alwi 1990, Kamma 1977:684-685).[70] In addition, the political link with Tidore may have constituted an important incentive. In any case, the Raja Ampat archipelago is as far east as islam ever reached, in the sense that whole autochthonous villages adopted it.

Nowadays the Ma'ya number between 4,000 and 5,000 people. About half of these live on Misool. Apart from Waigama on the north coast, all Ma'ya villages on Misool are located in the southeast, which is adjacent to rich fishing grounds. On this southeastern side there are the big villages Lilinta and Fafanlap, each with approximately 750 inhabitants. Gamta, on the banks of the Gam River, is somewhat smaller. Recently, people from Fafanlap founded settlements off the coast, the biggest of which are Yellu and Harapan Baru. These villages, however, are shared with migrants from outside the RA archipelago, and the Ma'ya socio-cultural identity is less strong here, and the language is declining. On Salawati there are the Ma'ya villages Samate (northeast coast) and Sailolof (southwest coast).

The situation of the Ma'ya on Waigeo is more complex. Among the Ma'ya of Waigeo, there are three different groups: the Laganyan, the Wauyai, and the Kawe. Laganyan is the name of the population of the villages Lupintol and Arway, both located on the western shore of Mayalibit Bay – this group agrees with the Misool and Salawati Ma'ya in function of all the sociocultural factors in Table C.1. The

[70] Interestingly, there is at least one clan in Fafanlap that has an Arabic family name (Alhamid).

Kawe and the Wauyai, on the other hand, did not adopt islam, one of the sociocultural features which distinguish the Maʲya from the interior-oriented groups. Unlike the Maʲya of the Laganyan, Salawati and Misool groups, they adhered to their own belief system until they adopted christianity around the middle of the 20th century. This implies that these groups have not been in contact with the Moluccas to the extent the other Maʲya villages have. In line with this, de Clercq (1893), who gives a detailed account of all villages in the Raja Ampat archipelago at the end of the 19th century, makes clear that the both the Wauyai and the Kawe did not live in villages along the coast.

While the Wauyai are not muslims, they very much share in the Maʲya cultural identity, as their village (Wauyai in Kabui Bay) is located near the sanctuary of the ancestor stone. The clan Gaman, one of the clans that lives in Wauyai, is the guardian of the stone, and the village as a whole is reminded of the myth by visitors to the sanctuary from other Maʲya villages. The Kawe lack such a link with the other Maʲya villages. Also, the remote location of their villages (Selpale and Salyo) in Aljui Bay in western Waigeo isolates them somewhat from the other Maʲya villages. When they adopted christianity, they turned away from their own belief system, and, doing so, from their link with the other Maʲya villages.[71] Still, they recognize the Maʲya migration myth, although their version is somewhat different from the one accepted among the other Maʲya villages.

Evidently, the land- vs. sea-oriented distinction, crystal clear on Salawati and Misool, is less obvious when we consider the Maʲya of Waigeo. While the Laganyan pattern with the Maʲya of Misool and Salawati, the Kawe and the Wauyai do so to a lesser extent. On the one hand, both their language and their mythology suggest a close connection with the other Maʲya groups. But the fact that they did not adopt islam, and the fact that they were not living in villages on the coast by the end of the 19th century (de Clercq 1893) indicate that they were interior-oriented.

This crucially confirms that the myth of the Waigeo origin of the Maʲya represents historical fact. Migrating from Waigeo, the Maʲya became outsiders on Salawati and Misool, confined to the coastal areas, with no rights on the land, and therefore dependent on fishing and trading, having to acquire sago through exchange with the original population of those islands. This seaward-orientation brought them in contact with the Moluccas, from where they derived power and islam. On Waigeo, on the other hand, there never was a dichotomy between the original inhabitants and the Maʲya, as the Maʲya were autochthonous themselves. They were therefore less outward-oriented, had access to sago themselves, and did not develop contacts with the Moluccas the way the Maʲya who had migrated did.

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[71] Kamma (1949:542) writes that the Kawe used to have a face-shaped stone, called “child of the stone (my translation)”. This tone commemorated their link with the original ancestor stone near Wauyai. When they adopted christianity, the Kawe gave this “child of the stone” with Dr. Kamma, who brought it to the Ethnology Museum in Leiden (the Netherlands). It is currently on display there.

C.1.3. Land-oriented groups of Misool, Salawati and Waigeo

The land-oriented populations of Misool, Salawati and Waigeo stand out jointly as compared to the Ma'ya, but do not constitute a single ethnic group. Each of them has their own language, and each considers itself as the original inhabitants of its island or area: the Matbat of Misool, the Ambel of East Waigeo, and the people of the interior of Salawati, for which no general name exists. Both the Matbat and the people of the interior of Salawati look distinctly Papuan, with a dark skin, frizzy hair, and a relatively big nose as compared to the Austronesian physical type.

When de Clercq visited the RA islands in 1887-1888, all land-oriented groups still lived predominantly in the interior. By the 1980's, all groups had moved to the coast. The causal factors of this development are pressure from Dutch and Indonesian authorities (van der Leeden 1980:206), and possibly the influence of christian missionaries.

Christianity was introduced soon after the move to the coast, probably not before 1925. On Salawati, for example, evangelization was in full progress in 1957 (Polansky 1957). By then most but not all villages had an evangelizer, but in many villages a substantial part of the population still adhered to their original belief system. The only report on the belief system of the interior-oriented groups of the RA islands is Polansky (1957), who discusses the shamanistic *mon* religion of the people of the interior of Salawati. In this religion, individuals were trained in contacting spirits through a trance. Such trance-sessions (*main mon* in Malay) were repeated twice per month. They were also organized to persuade disease-causing spirits to leave the bodies of sick people.

All land-oriented groups cultivate sago, and trade it with the Ma'ya villages on the coast (de Clercq 1893, van der Leeden 1993).[72] This age-old trade pattern, whereby the Ma'ya buy their sago from the interior-oriented groups, is still prevalent, and it constitutes at least part of the explanation why various interior-oriented groups chose to settle in the vicinity of Ma'ya villages.

The Matbat are the people of the interior of Misool. Their name means 'people of the land'. In the report of the biologist-explorer Wallace, the wordlist I argued to be of the Matbat language is introduced as the language of the interior (Wallace 1869:474). Two coastal Matbat villages, Atkiri and Lenmalas, are represented on Dutch maps based on data collected in 1944 (Nederlands Nieuw Guinea 1:100,000). In the case of Mage, a Matbat village in southeast Misool, the move to the coast must have taken place considerably later, as many of the villagers report that they were born and spent part of their youth in previous settlements of the village in the interior. As was mentioned above, some Matbat villages settled close a Ma'ya villages when they moved to the coast: Matbat Salafen is adjacent to Ma'ya Waigama, and Matbat Mage to Ma'ya Gamta (see Figure II.4). At least in the case of

[72] On his trip to Mayalibit Bay, de Clercq met Ma'ya from the south coast of Waigeo who had traveled there to buy sago from the Ambel (de Clercq 1893:151). Van der Leeden (1980) notes that in northern Salawati, the interior-oriented villages Mocu and Fiawat trade sago with neighboring villages, as they have extensive sago-gardens near the Waijan River.

Mage, education was an important reason to move to the coast. By moving to the vicinity of Gamta, the people of Mage gained access to primary-school education for their children.

There is no general name for the different groups of interior-oriented people of Salawati. While the interior-oriented groups of southern Salawati are called Kawit, a number of names have been reported for the land-oriented people of northern Salawati: Butleh, Banlol, Tipin, and Metli, which means 'land-oriented people' (see § II.3.5). Some groups moved from the interior to locations adjacent to Ma'ya villages: thus land-oriented Fiawat and Mocu are immediately adjacent to Samate, and Kawit people from southern Salawati have moved to the Ma'ya village Sailolof. The language situation of the land-oriented people of Salawati is unclear.

The traditional area of occupation of the Ambel is the interior of east Waigeo, but already by the end of the 19th century, their settlements were located on the northeast coast and around Mayalibit Bay (de Clercq 1893:174). Evidence from clan names suggests that the Ambel have been intermarrying with the Ma'ya (Wauyai and Laganyan groups), before this was barred by a religious divide when the Ambel adopted christianity between 1920 and 1960.[73] Interestingly, the Ambel / Ma'ya (Laganyan) members of a clan are distinguished in terms of the sea vs. land-oriented distinction. For example, Ambel people refer to Kasyan clan members in Lupintol (a Ma'ya village) as *Asyan lul* 'sea Asyan', to distinguish them from the *Asyan lil* 'land Asyan' in Warsamdin (an Ambel village). The intermarrying between Ma'ya and Ambel, is also evident from the skin color of Ambel people, which can be lighter than that of the Matbat or the interior-oriented people of Salawati.

In general, it is the Ma'ya who enjoy the higher status, which is reflected by the fact that the people of the interior switch to Ma'ya in between-group communication. During the era of Tidore domination, interior-oriented groups were subordinate to a Ma'ya *raja* (de Clercq 1893, van der Leeden 1993).

C.1.4. Biga and the symbiosis of land- and sea-oriented groups

One village constitutes a notable exception to the division between land- and sea-oriented groups. This is Biga, in southeastern Misool, with about 350 people.[74] Biga

[73] For example, the clan name Gaman occurs in Wayfoy, and Lamlam (Ambel), Wauyai (Ma'ya – now christian), Lupintol and Arway (Ma'ya – muslim). Other clan names linking Ma'ya and Ambel are Kasyan (also Asyan or Syam) and Dayolon (also Dailom).

[74] In 1887-1888, the village consisted of four big houses on poles, each of which was occupied by approximately 50 people (De Clercq 1893:187,197). According to de Clercq, these houses were the best he saw in the whole RA archipelago. Today, the number of houses has greatly increased, and each houses a single family. However, the whole village is still on poles on the water. A bridge, more than 100 meters long, runs from the shore to the sea, and all houses are built on opposite sides of this bridge. When the poles supporting a house decay, its occupants build a new house on poles behind it, and connect it to the main bridge via a connecting passage, also on poles. In Fafanlap the main connecting road is on the shore, and half of the houses are built on poles. The same is the case in Wauyai, but here a number of houses

– the name means ‘sago place’ – plays an important role in the local economy, as it provides sago for both Lilinta and Fafanlap, the two big Maˈya villages in the area. Various local sources said that Biga was the first village on Misool to take the christian faith. Physically, the Biga have a dark brown skin, and their head hair is frizzy. In summary, in function of religion, economic activity, and physical appearance, Biga patterns with the interior-oriented groups.

Like the sea-oriented Maˈya, on the other hand, the Biga people claim a Waigeo origin. According to themselves, altogether 12 clans would have moved from Waigeo to Biga. De Clercq reports that the Biga people told him they hail from the Kawe region. In any case, the Biga language is different from both of the original RA languages used on Misool, Matbat and Maˈya, although it is similar to the latter, a fact already noted by de Clercq (1893:187). Interestingly, Biga shares a number of words with Ambel and the language of the village Fiawat on Salawati (see Chapter II), both languages of interior-oriented groups. So on the whole, the linguistic evidence suggests that the Biga migrated to Misool from Waigeo or Salawati, and that they were an interior-oriented group there.

The linguistic data do no allow us to be more specific as to the area of origin from where the Biga migrated. An important complicating factor is that the ratio of original RA population over the number of languages is such that a group of families may have migrated without leaving much of a linguistic trace in terms of people who stayed behind speaking the same dialect or languages.

In the Misool context, Biga functions as an interior-oriented village, since it provides sago for Maˈya villages in the area, in particular for Lilinta. Exactly the same relation is found between Gamta and Mage, Waigama and Salafen, and finally Samate and Fiawat and Mocu. In each case, the Maˈya and interior-oriented villages are adjacent, and as a result each group can specialize in some activity. The interior-oriented village specializes in sago production, the Maˈya village in fishing and maybe some trade. The villages do not merge, however, divided as they are by differences in physical appearance, culture, language, and religion. The same relation appears to have existed between Maˈya and Ambel in Waigeo (see footnote 73).

There appears to have been a balanced and well-defined relationship between the Maˈya and the various interior-oriented groups. While the contact between them was limited, each profited from the trading relationship they had. In the case of Biga, this symbiotic relationship may have been created intentionally, as it appears that in this case an interior-oriented group moved to a location between to two big Maˈya villages on Misool, in order to fulfill a demand it may well have already fulfilled in Waigeo.

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were being rebuilt on the shore while I was in the village (March 2000). In Lupintol, almost all people had moved to the land, according to themselves under pressure of the local government.

C.1.5. Conclusion

Differences in religion, mythology and history, economic activity, language and physical appearance warrant the distinction between the sea-oriented Ma'ya and the land-oriented groups. On Salawati and Misool the Ma'ya have a higher status, but this does not cause friction. The groups of the interior, on the other hand, can profit from their specialization as sago producers. The harmonic relation between Ma'ya and the land-oriented groups is evident from the fact that various groups of the interior settled near a Ma'ya village as they moved to the coast. Presumably, they moved near the Ma'ya village they had been selling sago to before. Biga may be an interior-oriented village which migrated with the Ma'ya to Misool to continue fulfilling its sago-providing role.

In any case, combinations of adjacent Ma'ya and interior-oriented villages enjoy better public services than they would as single isloated villages, since the Indonesian government caters education and health care on the basis of the number of people living in a location. Individual villages often are very small, in the range of a few hundred inhabitants. By moving closer together, the villages may fulfill a census criterion that brings a primary school teacher or a health care worker.

On Waigeo, the sea-oriented group is less well defined by the sociological variables that distinguish it on Salawati and Misool. This was interpreted as evidence that (western) Waigeo is the region of origin of the Ma'ya. Variation is greater here, because the Ma'ya who left constituted a subset of a population with more within-group variation in its sociocultural features. The Ma'ya who migrated had their language and physical appearance in common with the Kawe Ma'ya and the Wauyai Ma'ya.

C.2. The history of the Raja Ampat archipelago

C.2.1. The era of Tidore

C.2.1.1. Tidore and New Guinea

When European trading companies arrived in the eastern part of the Malay archipelago in the early 16th century, they found the north Moluccan sultanates of Tidore and Ternate in control of the spice trade. The wealth which the North Moluccan sultanates derived from the spice trade translated into regional influence, as Ternate expanded to the west (Sula islands), and Tidore to the east (western New Guinea). Islam had reached the North Moluccan sultanates not long before the arrival of the Europeans, and was spreading further east from there (Hanna & Alwi 1990).

Most early records on the Raja Ampat archipelago come from Portuguese and later Dutch documents relating to the sultanate of Tidore. In 1667 the Dutch East Indian Company (V.O.C.) signed a contract with Tidore, granting Tidore a

monopoly of trade with the 'Papuan islands' (Dutch: *Papoesche eilanden*), by which the Raja Ampat islands were known at that time. It may well be that Tidore's supremacy was not fully established by that time, and that this treaty actually supported Tidore in its endeavor to consolidate its influence in the Raja Ampat archipelago and further west on the New Guinea mainland. Until the end of the 19th century, the Dutch East Indies Company and later the Dutch colonial government overestimated the role of Tidore as overlord of RA area and elsewhere in west New Guinea (Kamma 1948:553; Huizinga 1998). Initially, the Dutch appear to have believed that Tidore's claims on west New Guinea were genuine, and hoped that, by acknowledging them, they would acquire an ally who would support their monopoly over the spice trade and counter the activities of pirates. Later on, in the 19th century, as the colonial powers carved up New Guinea, the Dutch government knowingly overestimated Tidore's influence in order to boost its own far-reaching claims on west New Guinea (Huizinga 1998:388). That is, by acknowledging a greater part of west New Guinea as dominated by Tidore, the Dutch indirectly extended their own sphere of influence, as they were the overlords of Tidore.

In reality, there is no evidence of involvement of Tidore beyond the Cendrawasih Bay area. Within this sphere of influence, this involvement comprised little more than the extraction of tribute in trade goods and slaves (Kamma 1948, Huizinga 1998). In each group where it levied such a tax, the Tidorese appointed a headman, who was responsible to collect the tax and bring it to Tidore. Because the involvement of Tidore was limited to extracting tribute, there was little incentive for people to provide it voluntarily. Villages sometimes failed to deliver the tribute to Tidore as they were supposed to, in particular those in the Cendrawasih Bay area, located far from Tidore. Here the tribute was only paid under the threat of the *hongi*, the dreaded raiding fleet which terrorized and plundered villages that had failed to bring their tribute themselves.

C.2.1.2. The four *rajas* as vassals of Tidore

Like elsewhere, a number of headmen were appointed in the Raja Ampat archipelago. They were the *raja* of East Misool, West Misool, Salawati and Waigeo, after whom the Raja Ampat – *ampat* is 'four' in Malay – were named. All *rajas* – and the lower-status headmen who had the title of *kapitan laut* – resided in Ma'ya-speaking villages. The relation of Tidore with these *rajas*, though, was considerable stronger than with the headmen of Cendrawasih Bay. Rather than mere representatives for tax collection, they were – most often loyal – vassals of the Tidorese sultan.

Right from the start of recorded history, at the beginning of the 16th century, the North Moluccan sultanates were closely related to the Raja Ampat archipelago. In 1534 the *rajas* of Waigama and Waigeo are recorded to have taken part in a joint effort of the North Moluccan sultanates to get rid of the Portuguese colonizers (Kamma 1948).

Like other headmen, the RA *rajas* were obliged to deliver a yearly tribute in slaves and goods to Tidore. At least some of them, though, were additionally

responsible for the collection of this tribute in other areas. For example, Valentyn (1726 in Haenen 1991:9), for example, reports that the *raja* of Onin was subordinate to that of (presumably East-)Misool, who in his turn was subordinate to the Tidorese sultan. Also, documents from 1705 report that the sultan of Tidore collected a tax in slaves and goods from areas on the north coast of New Guinea up to Cendrawasih Bay, and that this tax was collected by the *raja* of Salawati (Leupe 1875 in Miedema 1984). In that year the *raja* of Salawati was reported in a village in the Bay of Doreh, near modern Manokwari (Leupe 1875 in Miedema 1984). On the basis of more detailed accounts of a later date, these records of tribute collection can only be interpreted as indicating that the *raja* of Salawati organized *hongi* fleets which when necessary collected tribute by force.

Of the four *rajas* of the Raja Ampat archipelago, the one of Salawati was the most powerful (Miedema 1984:8). At the end of the 19th century, the *raja* of Salawati controlled the Bird's Head coastline from the Kalabra River (on the southwest shore of the Bird's Head) up to Cape of Good Hope, the most northern tip on the north coast of the Bird's Head (de Clercq 1893, references in Huizinga 1998). De Clercq also reports that there is a settlement of Salawati people on the north coast of the Bird's Head (As or Asbaken).

All Ma'ya villages that were the seat of a *raja* or a *kapitan laut* are muslim. This is an important indication of the fact that the relation between Tidore and the headmen of the Raja Ampat archipelago was considerable strong. Kamma (1977) writes that the Papuans obstinately refused to adopt islam. The fact that the Ma'ya villages did become muslim indicates that they were connected with the Moluccas by strong political, sociocultural and commercial links.

C.2.1.3. Raiding and trading

Until the beginning of the 20th century, the trade with west New Guinea was dominated by commercial centers in the Moluccas, most notably the North Moluccan sultanates and the principalities of insular East Seram (Goodman 1998). The former network is the better known, thanks to the interest of European traders and later on Dutch colonial officials in Ternate and Tidore. The second has received comparatively little attention because the East Seramese villages involved attracted little interest from European observers.

Traders from these centers sailed to New Guinea to buy, among others, massoy (aromatic tree bark), tripang (sea cucumber), damar (a tree resin), birds of paradise, pearls, gold, nutmeg, sago, and of course slaves (Kamma 1948:549, Goodman 1998). In exchange for these goods and slaves they brought metal products (axes, knives, swords), textiles, and trade goods such as glass beads, bracelets etc. (Goodman 1998).

Tidore acquired goods and slaves as part of its yearly taxation. For example, in 1871 the *raja* of Salawati owed the sultan of Tidore a tax of two slaves every three years. The East Seramese traders had *sosolot* monopolies, in which a group in New Guinea exchanged goods with a specific East Seramese village (Goodman 1998).

In the slave trade, the Ma'ya villagers were important suppliers. In 1706, Leupe reports that the people of Salawati support themselves predominantly through robbery (Miedema 1984). Referring to the *rajas* of Waigama, Waigeo and East-Misool, van der Dusen (1610) reports that "they rob incessantly on the shores of Seram, from where they get not little in loot of gold and slaves" (Haga 1884 in Kamma 1948, my translation). In 1653, a fleet of 15 vessels from Salawati and Waigeo threatened Hitu, on the north coast of Ambon (Haga 1884 in Kamma 1948).

Another important supplier in the slave trade was Onin, on the southwest coast of New Guinea, but here the principalities of East-Seram monopolized the trade via the *sosolot* trading networks (Kamma 1948:551, Goodman 1998). In general, the slaves were acquired both as part of regular trade and by means of raids to west New Guinea, but also to the Moluccas. Miedema (1984) discusses the profound effects of the continuous danger on communities on the north coast of New Guinea.

Also, it was not unusual for raiders to kidnap people if there was the possibility of extorting a ransom from their village. In one of the earliest documents dealing with the Raja Ampat archipelago, Roxo de Brito describes such practice by a raiding fleet from Misool, which kidnaps leaders of wealthy villages in East Seram in 1581 or 1582 (Sollewijn Gelpke 1994:130-131). In another reported case of kidnapping, this trick is played on the raiders from the Raja Ampat archipelago themselves. When in 1710 the *raja* of Salawati is in the Cendrawasih Bay area, Tidorese pirates kidnapped his wife and children and 150 of his people. He bought their freedom for 104 slaves (Miedema 1984).

The historical documents involved do not specify which Raja Ampat villages were active in raiding, piracy and slave hunting, but we can safely assumed that it is the sea-oriented Ma'ya villages. To this day the Ma'ya villages acquire their staple carbohydrate sago from other groups.

Pirates from the Raja Ampat archipelago and elsewhere sold the slaves on the markets in Tidore and east Seram, where the physically stronger Papuans commanded a higher price than Austronesian slaves did (Goodman 1998). Demand for slaves increased considerably after the Dutch East Indies Company (VOC) monopolized the spice trade in the course of 17th century. Slaves were needed for the spice plantations on Banda and Ambon, and the VOC tried out a variety of ways to obtain them, from buying at the East Seram slave markets, obtaining them through exchange in Onin, and raiding (Kamma 1948). In fact, the monopoly system by the Dutch East Indies Company has been blamed as the highest-order cause of slavery in the Moluccas and New Guinea (Kniphorst in Kamma 1948). While it is unclear whether slavery existed in the Moluccas and west New Guinea before the arrival of the Europeans, it evidently flourished as a consequence of the monopoly on the spice trade by the VOC.

In the course of the first half of the 19th century, the Ma'ya of Salawati lost their dominant position in the slave trade on the north coast of the Bird's Head and Cendrawasih Bay to raiders from Gebe and Biak (Miedema 1984). Haga (1884 in Miedema 1984:7) suggests that the increased competition from Biak is a reaction to the raids which the Biak people had suffered themselves in the past.

C.2.1.4. Decline of the power of the Raja Ampat *rajas*

Various authors have noted that there is a marked difference between the reports preceding the end of the 18th century and those postdating approximately 1830. It was mentioned above that before the end of the 18th century, Salawati exercised authority in Tidore's territories on the north coast of western New Guinea, an area extending up to and including Cendrawasih Bay. In 19th century reports, however, the influence of Salawati is limited to Cape of Good Hope. Similarly, while the *raja* of (presumably East-)Misool is reported to control Onin for Tidore in the early 18th century, this influence no longer exists in the second half of the 19th century. De Clercq, who traveled to Onin in the company of the *raja* of East-Misool, states most clearly that the latter had no influence and was not paid any particular respect there (de Clercq 1893:160).

Kamma (1948:263) relates this decline to the period of chaos the sultanate of Tidore went through at the end of the 18th century. In 1780 the Dutch selected the next sultan, a privilege they had recently appropriated, and ignored two princes that were in line to become sultan (Hanna & Alwi 1990). One of them, prince Nuku, started a rebellion. After an initial defeat he moved his power base to the Raja Ampat islands, and finally conquered Tidore in 1795, with military support from the English who challenged the Dutch monopoly in the Moluccas. The unrest went on during the following decades, as Nuku went on to conquer Ternate. His contested successor, the *raja* of Jailolo, continued to use the Raja Ampat islands as his power base. According to van der Crab (in Kamma 1948), a large part of the male population of the RA islands followed Nuku on his campaigns, so that the area would have been depopulated by the time order was restored, around 1840. In any case, the power of the *raja* of Salawati had declined considerably. After the restoration of order in Tidore, it was Gebe that took over Salawati's role in the *hongi* fleets that intensively raid the north coast of the Bird's Head and Cendrawasih Bay for slaves between 1840 and 1850 (Huizinga 1998).

The perceived decline may also have to do with the fact that the sultanate of Tidore, and the Ternate sultanate likewise, never were organized states in the first place, and had been overestimated initially. When the Dutch finally collected first-hand information on the influence of Tidore in west New Guinea in the 19th century, they found it to fall short of earlier reports, both in terms of geographic scope and in quality.

An event that undoubtedly played an important role in the decline of Tidore's influence in west New Guinea in the 19th century was the prohibition of the *hongi* raids, which constituted the only incentive to pay tribute to Tidore. By the middle of the 19th century, the Dutch colonial government became increasingly aware that Tidore's influence in west New Guinea amounted to little more than raiding and slavery. Dutch administrators started restricting the *hongi* raids, and tried to abolish slavery through a number of contracts with the North-Moluccan sultanates. Tidore's influence in western New Guinea ended simultaneously with the prohibition of the *hongi* raids in 1862 (de Clercq 1893:162). Slavery ended in Ternate and Tidore only in 1879, as the Dutch colonial government bought the freedom of 1371 slaves on

Ternate and 3078 on Tidore (Kamma 1948:268). In western New Guinea this abolition of slavery only took effect gradually. Villages in New Guinea had been raiding one another for slaves for a long time, and it took time before the absence of a market and pressure of the colonial government caused this practice to be discontinued. The clearest evidence of the continuation of this practice is that in 1918 the colonial local administration liberated 143 slaves in Samate and moved them to Sorong (Kamma 1948:268).

In summary, the decline of power of the *rajas* started with the chaotic state of the Tidore sultanate at the end of the 18th and the beginning of the 19th century. Later, in the second half of the 19th century, the prohibition of the *hongi* raids (1862) and the end of slavery (1879) reduced their position as vassals of the Tidore sultan to a symbolic one.

C.2.2. Dutch rule and the Indonesian present

C.2.2.1. Dutch colonization

Until 1898, the Dutch part of New Guinea was governed from Ternate, in the North-Moluccas. This government did not amount to much involvement, apart from the abolition of slavery in 1879, which did have a profound impact in west New Guinea. In 1898, a first government post was founded in Fakfak, on the southwest coast of New Guinea, and this was the first step in increasing involvement (Overweel 1998). At the end of the 19th century a number of expeditions had visited the north coast of New Guinea, mainly to determine the extent of Tidore's influence, in the context of the controversy on the division of New Guinea between colonial powers (Huizinga 1998). After the establishment of a permanent post on New Guinea, a beginning was made with the exploration of the interior. A policy was developed on how to colonize west New Guinea, and both private and military explorations crisscrossed the country before 1915 (Overweel 1998). Government officials were stationed at a number of key coastal locations, and their reports provided accurate information on the situation (Miedema & Stokhof 1992, 1993). They also introduced taxes, a judicial system, health care, regular maritime transport and postal service, etc. The hunt on exotic bird species such as the bird of paradise was regularized, and so was the exploitation of natural resources.

The advances made in the state of public services are evident from a report by Polansky (1957), at the end of his term as local administrator of Salawati. This report is probably representative of the situation in the Raja Ampat archipelago in general at that time. There were five state-subsidized schools, and most villages that did not have a school had an evangelist who also served as teacher. Health care was provided in Sorong and in Seget, and the personnel of an ambulant medical center visited most villages by boat, providing vaccination. Other services include jurisdiction by the colonial government administration and government-sponsored cooperatives that bought agricultural and other products from villagers and sold them in Sorong. In order to be able to control villages and to provide services, the

colonial government encouraged the formation of larger villages in accessible areas, that is, near the coast.

C.2.2.2. Traditional Raja Ampat leadership under the colonial regime

When possible, the colonial government made use of local power structures to exercise its authority. Traditional leaders received letters of recognition of their title from the Dutch authorities, and a wage, the size of which was dependent upon their usefulness to the colonial authorities. The amount of the wage was regularly evaluated, in order to ensure that it was in line with a leader's performance, and in case of bad performance, the local leader could lose his title. Also, neither the title nor the wage was automatically inherited, although the Dutch authorities tried to accommodate local traditions.

The report by the administrator Maurenbrechter (in Miedema & Stokhof 1993) makes clear that there are important differences between local RA leaders in the influence they have among the population. For the local leaders of the Biak settlements (the *senadjis* Omka, Beser, and Wardo, and the *gimelaha* Oesba), the monthly wage was only 15 guilders for each leader, and the report states that these leaders had very little influence in their communities. The report notes that vacant posts were left unfilled, and that there was no reason to fill them. Apparently, there was no strong tradition of leadership in the Biak communities. On the other hand, the traditional Ma'ya leaders, the *rajas* of Salawati, West-, and East-Misool, and the *kapitan lauts* of Salawati and Misool, receive a monthly wage of 100 (*rajas*) or 60 (*kapitan lauts*) guilders, respectively. The report notes that these leaders have considerable power in the villages in their sphere of influence, and finds their relatively high wage to be commensurate with their influence and performance.

However, Polansky (1957) notes that the influence of local leaders is shrinking, and that most of them only have influence among the members of their own village. Polansky distinguishes two causes for this decline.

One important factor in the decline of the power of the *rajas* is the advance of christianity in the Raja Ampat area. Except for the majority of the Ma'ya villages, which had received islam from traders or from the Tidore sultanate, most villages in the Raja Ampat area adhered to an animistic religion, such as the *mon* religion of Salawati. In 1855 the protestant missionaries Otto and Geiszler founded the first mission in Doreh Bay, near modern Manokwari (Kamma 1977). In the earliest reference to missionary activities in the Raja Ampat area, Kamma (1977) mentions the names of three teachers of the protestant mission, who in 1914 were active in Sorong, Saonek and Samate, respectively (see Figure II.4). By the middle of the 20th century, the majority of the interior-oriented villages of Salawati were being converted to christianity, and by 1957, over half the population of the administrative unit Salawati was christian (Polansky 1957).[75] As Polansky reports, this

[75] This administrative unit (Dutch 'district') consisted of Salawati, Batanta, and the coastal area of New Guinea adjacent to Salawati (Polansky 1957). Its population in 1957 was 4881 people: 2623 christian (53.7), 1586 heathen (32.5%), and 671 muslim (13.7%).

development met with opposition from the Salawati *raja*, who feared that this expansion would result in the reduction of his influence in the evangelized villages. Indeed, the only villages that still obey the orders of the *raja* in 1957, Yefbo and Pakon, were villages adhering to the shamanistic *mon* religion.

A second important factor in the decline of local leadership was the presence of the Dutch colonial government. As the colonial authorities took active control of local government in the course of the 20th century, this reduced the relevance of the local leaders. The colonial authorities dealt with traditional leaders as they saw fit. In August 1957, for example, the *kapitan laut* of Sailolof, who had been considered a promising local leader in Maurenbrechter's report of 1953, was condemned to the loss of his rank and two months imprisonment on charges of fraud (Polansky 1957). This must have given a clear signal to the population that the power of traditional leaders was limited.

With the Indonesian takeover looming after 1950, the Dutch colonial government strived to emancipate the Papuans so as to make them ready for self-government. The involvement of the colonial authorities in local government increased considerably (Drooglever 1998:482), and in 1951 the authorities tried to lay the foundations for democratic decision-making in west New Guinea, so as to prepare the Papuans for self-rule (Maurenbrechter 1953 in Miedema & Stokhof 1993). In each of the four districts in which west New Guinea was divided, an advisory body was established. The members of these bodies were not elected, "because most of the population is not considered ready for this modern technique of representation" (Maurenbrechter 1953 in Miedema & Stokhof 1993:201). Instead, they were appointed by the administrator, who took care to represent all sections of society. In 1953 three members of this body hailed from the Raja Ampat archipelago: Abukasim Arfan, the *raja* of Salawati, his brother Abdullah Arfan, who had a job as an assistant administrator of Salawati, and A. Boegis, imam in Waigama (Misool). Abdullah Arfan's career as a representative of New Guinea later took him to the conference on the future of Dutch New Guinea in The Hague.

Also at a lower level, the colonial authorities tried to involve the population of New Guinea in government. Polansky (1957) discusses the possibility of a district council of Salawati. Noting the fragmented nature of the Salawati population, divided as it is by religion and ethnicity, Polansky indicates that such a council could only be arrived at in two phases. First councils would be chosen to represent villages from the same area, which share a social background. From these lower level council representatives could then be elected to the Salawati district council. Probably, this body has never been formed. If it has been formed, it did not last long, because 1962 saw the end of Dutch rule in West New Guinea.

C.2.2.3. Armies passing by: World War II and the Dutch-Indonesian conflict

The second world war caused considerable upheaval in the Raja Ampat archipelago. At the maximal expansion of the Japanese conquest, the Japanese army occupied the north coast of New Guinea, and the allied forces were on the south coast of the island. The Raja Ampat archipelago was on the frontline. This is reflected by the

large amount of military equipment – mostly planes – resting on the seafloor between the Raja Ampat islands. In many villages people have vivid memories of the war that passed by. Probably no village suffered more than Samate, the traditional seat of the *raja* of Salawati. The Japanese army found it to be the most comfortable village in the area, and chose it as its camp, close to the airstrip on Yefman. The village population was displaced, and they moved to the nearby island of Kasim. As the allied forces learned that the Japanese army was located at Samate, they bombed it, leading to the total destruction of what must have been the biggest village of the Raja Ampat archipelago. The population of Samate moved back to their village in the 1960's. Van der Leeden (1995) presents a Ma'ya account of the destruction of Samate.

After the rest of Indonesia gained independence between 1945 and 1950, West New Guinea remained Dutch territory until 1962. First the Dutch wanted to keep west New Guinea as a colony, with the objective of making the Papuans ready for self-government. As the pressure from Indonesia and the United States increased, the Dutch government offered to hand over west New Guinea to the United Nations.

In the two years immediately preceding the Indonesian takeover, the Indonesian armed forces repeatedly sent small units to infiltrate west New Guinea by air or by sea (van Horst Pellekaan, de Regt and Bastiaans 1990). These actions had no military value, but were meant to keep the diplomatic pressure on the Dutch government to concede (van Horst Pellekaan et al. 1990:132). Various such operations took place in the Raja Ampat archipelago in months immediately preceding the agreement between the Netherlands and Indonesia on August 15, 1962: at the village of Aduwey on Misool and in Aljui Bay on Waigeo. The people of the Raja Ampat archipelago appear to have sided with the Dutch, as is evident from the fact that in both cases local people informed the Dutch authorities about the infiltrations (van Horst Pellekaan et al. 1990). Only on Gag, whose population had migrated there from Gebe, did the population support the Indonesian troops who landed there.

C.2.2.4. The Raja Ampat archipelago in Indonesia

After the Indonesian takeover, West New Guinea was renamed Irian Jaya. Like the Dutch before them, the Indonesian authorities supplied a number of services, including health care, education, and public transportation over sea.

An important development under the Indonesian regime has been the migration of people from elsewhere in Indonesia to the Raja Ampat archipelago. This issue will be dealt with in § C.2.3.

The Indonesian authorities did not continue the Dutch policy of accrediting traditional leaders. Instead, members of the former ruling clans were dominant in key government jobs, like village head (*kepala desa*), health official (*mantri*), leader of the cooperations. The same was the case one level up the administrative hierarchy: the districts (*kecamatan*) Misool and Salawati were led by members of the Soltif and Arfan clans, respectively, in the course of last decades.

C.2.3. Outside influences and the reaction of the Raja Ampat people

The population of the Raja Ampat archipelago has grown considerably in recent decades, in particular through immigration. This is a sensitive issue, which has recently triggered the foundation of an organization to defend the rights of Raja Ampat people (LEMAKAF). This section looks at the outside influences that led to the foundation of LEMAKAF, and at the structure of this organization.

C.2.3.1. Migrants

Various groups have migrated to the RA archipelago at various points in history, and there are important differences between these groups.

Most integrated are clans whose ancestors came – as individuals or in small groups – to live in a Ma'ya village in the remote past. In this way, the clan names Soasiu and Alhamid indicate a Tidore and an Arabic ancestry, respectively. Other clans have a Seramese or other Moluccan ancestry. These clans speak Ma'ya and are totally integrated in Ma'ya society.

Second, there are people whose ancestors moved to coastal south and east Waigeo from the Cendrawasih Bay area. Their origin is well established (de Clercq 1893), and is evident from their languages, which constitute dialects of Biak (Hartzler 1978, Smits & Voorhoeve 1992). The original RA population refers to these people as Beser.[76] The settlements occupied by these groups were included in Tidore's age-old claim on New Guinea, as recorded by de Clercq in 1887-1888, which implies that their migration from Biak and Numfor to the RA area must date back to well before that time. The fact that the name of the Ambel appears to derive from the Biak word /amber/ 'stranger', is also indicative of their long presence in the area. De Clercq (1879) reports them to be subordinate to the *raja* of Waigeo. However, they have kept their own identity, and when the last *raja* of Waigeo died in the first part of the 20th century, their position in the Raja Ampat archipelago has become unclear. There are two instances of Beser people sharing a village with Ambel: Warsamdin and Kabare. Undoubtedly, these developments have been motivated by a desire to forge closer connections with the original population of Waigeo. The Beser outnumber the original Raja Ampat groups on Waigeo, and this has led to tension. Irrespective of the long history of residence of the Beser in the RA area, members of the Ma'ya and Ambel groups have claimed that the Beser have no rights to the land they occupy.

The case of the Gebe people on the island Gag, southwest off the coast from Waigeo, is similar. Gebe is a group of islands halfway between Waigeo and Halmahera. People from Gebe migrated from their islands of origin to Gag. This settlement dates back to well before 1878, because de Clercq (1893) mentions that Gag is occupied by people from Gebe.[77] In recent decades a foreign company started

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[76] This use of the name Beser appears to be a parsprototo, since de Clercq (1893:16) mentions Beser as one of the nine villages of these migrants from Biak and Numfor.

[77] De Clercq's statement on the status of Gag is the following: "In *De Indische Gids* [= name of journal, BR], 1889, August edition, page 1301, I have given a short description of the island Gag, in the

to mine nickel on Gag, and the original RA islanders believe that they should receive compensation, rather than the Gebe people who live on Gag.

Migration to the RA archipelago accelerated considerably in the latter part of the 20th century. While population currently stands at 35,338 (Sorong Dalam Angka 1998) this is an enormous increase from 12,004 in 1953 (Miedema & Stokhof 1993:274) and 22,095 in 1973 (van der Leeden 1993:2). Next to improvements in health care, immigration is the most likely causes for this increase: since the end of Dutch rule, many people have migrated to the RA islands, particularly from western Indonesia. To some extent, this migration has been organized by the Indonesian government (the *transmigrasi* program). At Kalobo on Salawati for example, there is a transmigration village, and both Ma'ya and Butleh people have joined the settlement, presumably in order to enjoy better services. Others migrate individually, and they may join a village of original RA people. Among others, there are now significant numbers of Butonese and Buginese in the RA islands, in particular in areas featuring rich fishing grounds such as the southeast coast of Misool. A large proportion of the population of the villages Yellu and Harapan Baru, off the coast of southeast Misool, are migrants from outside the RA archipelago. But unlike the incidental individuals or clans that joined original RA villages in previous centuries, the new migrants do not need to learn the local languages in order to be able to communicate, because nowadays all the original RA people are fluent in Malay or Indonesian. As a consequence, these recent migrations constitute a serious threat to the survival of all local RA languages.

C.2.3.2. Companies

A final group of migrants are the employees of companies. These companies include an Indonesian fishing company operating in southeast Misool, pearling operations in Waigeo and southeast Misool, the nickel mine on Gag, and oil mining in eastern Salawati. Logging takes place at various locations. Some companies offer the RA islanders free transport to and from Sorong. In this way, Aljui Bay in west Waigeo and Yellu in southeast Misool, remotely located in the corners of the RA archipelago, are now connected with Sorong by regular boat services (at least twice per week). A number of companies also offer employment, in particular the Australian pearling operation in Aljui Bay and the Japanese one in southeast Misool.

The effect of these companies cannot be underestimated. The Australian pearling operation has two base camps in Aljui Bay. With a population of over 100 people (westerners and people from elsewhere in Indonesia), these camps are almost as large as the nearby village of Selpale. The traditional way of life is continuously challenged, as villagers working for the pearling operation adapt to a new lifestyle, and as goods and fuel are available at the company shop. The company tries its best to accommodate the village, but every step it takes inevitably breaks the mold of the old ways. By allowing people to buy goods and fuel at the company shop they ended

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conviction that it belongs to Waigeo. Because I have been informed later that it is considered to be part of Gebe, I have not included this description here." (de Clercq 1893:17 [my translation])

a lucrative business for the villager who used to sell those goods with substantial profit margins. When the company organized bread production in the village, with the generous arrangement that they would deliver the raw materials for free, and buy the bread later on, arguments broke out in the village when the women of a less prominent clan suddenly got a lot of money. Evidently, companies bring about a radical change in the lifestyle of several villages in the Raja Ampat archipelago.

C.2.3.3. The reaction of the original RA people

The original Raja Ampat population is now a minority in its own region. This situation has forced the RA islanders to consider their own sociocultural situation, and to organize themselves.

The result of this process has been the foundation of the 'organization of the people of the Raja Ampat archipelago on the basis of their own traditions' (*Lembaga Masyarakat Adat Kalanafat (Raja Ampat)* – LEMAKAF for short). This organization is to defend the rights of the original RA islanders in dealings with the government, companies, and migrants.

This organization was established solemnly on March 27, 2000, in the presence of the mayor of Sorong, and various government officials. One of the first activities of the people who took the initiative was to make a list of original RA clans. However, this list only includes clans whose ancestors are considered to hail from the RA. It excludes all of the groups of migrants mentioned in § C.2.3.1, including well-integrated clans such as the Alhamid or Soasiu from Fafanlap. While this attitude towards outsiders does not come as a surprise in the current climate of large-scale spontaneous and state sponsored migration to the RA archipelago, it actually appears to predate it. In 1953, when the RA islands and the rest of the Dutch part of New Guinea had hardly seen any migration at all, the Dutch regional administrator for the Raja Ampat and Bird's Head area makes the following statement:

> On the whole, the population takes a quite narrow-minded perspective [on the right of migrants], summarized by the phrase *kita punya tanah air* [it is our land]. According to this point of view, foreigners cannot own land. [Maurenbrechter 1953 in Miedema & Stokhof 1993:197 (my translation)]

In the drive to unite themselves, the land- and sea-oriented groups ignore what distinguishes them from one another. Speakers of Ambel insist that their language is the same as that of the Laganyan, Wauyai and Kawe Ma'ya villages on Waigeo. Also noteworthy is how unimportant the religious divide proves to be: at the same time as inter-religious strife is raging in the neighboring Moluccas Province, muslim and christian RA islanders cooperated intensively in the setup of LEMAKAF.

The driving forces behind LEMAKAF are the powerful clans, and they have designed its structure as a variation of the original power structure of the RA islands. In this way, the local leaders of this organization are called *rajas*, but instead of following the original tradition in assigning them to Waigeo, Salawati, East Misool and West Misool, the 4 *rajas* are assigned North Waigeo, South Waigeo, Salawati, and Misool. This alternative structure follows the division of the local administrative

districts (*kecamatan*) of the Raja Ampat islands in the Indonesian state structure. Some positions of power have been assigned to members of clans who did not have these positions in the past. Also, the structure includes one *raja* at the top, above the four *rajas*. This position has been added to accommodate a place for a single leader of LEMAKAF, and is currently filled by Thahir Arfan, of the *raja* clan of Salawati. Importantly, the Beser, who used to be subordinate to the *raja* of Waigeo, are not represented in this institution, and that is an obvious weakness of LEMAKAF.

It may be surprising that the hierarchy of LEMAKAF mirrors the traditional power relations of the Raja Ampat archipelago. However, the powerful position of the ruling clans has never been contested, so there is no reason for it not to continue. Even now that the *rajas* and *kapitan laut* are not accredited by the state, the clans that used to have these titles are still in power. LEMAKAF makes explicit a system that has never ceased to function. Since LEMAKAF was set up only in March 2000, it is unclear where this new development will lead.

C.2.3.4. Summary

The discussion of the history of the RA islands from the 16th to 19th century shows that the sea-oriented Ma'ya villages had a strong connection with the North-Moluccan sultanate of Tidore. Both as vassals of the sultan of Tidore and on their own account, the Ma'ya villages were active players in the raiding and trading that went on between the Moluccas and western New Guinea. The historical sources indicate that the Ma'ya lived from raiding, and were dependent on others for their staple carbohydrate. At the end of the 19th century, the Ma'ya of Salawati were reported to buy rice from the people of Amberbaken (Miedema 1984:9), east of Cape of Good Hope. Nowadays, the Ma'ya still do not produce sago themselves, but instead they buy it from the interior-oriented villages.

The traditionally powerful clans maintained their position through the changes that have taken place in the last two centuries. From being the raiding vassals of Tidore they found new roles in the Dutch and Indonesian administrations. As the structure of LEMAKAF shows, this feudal clan system has survived until now.

While information on the history of the RA islands is scarce in general, there is hardly any mention of the interior-oriented groups in historical sources before de Clercq (1893). Anthropological research on these groups is very much worthwhile, as it would present data on cultures about which very little is known.

Appendix D Maˈya text: harvesting sea cucumber in Samate

This Maˈya text was narrated to me by Hud Arfan (55), in April 1999. It deals with the Maˈya customs relating to the harvesting of sea cucumber, a scarce and therefore valuable commodity. In Samate sea cucumber is managed by means of regular prohibitions to harvest it, which allow the crop to regenerate. These prohibitions are part of Maˈya culture, and it is taboo to break it. Prohibition for the sake of sustainability is not uncommon in Eastern Indonesia, where this practice is known as *sasi*. The lifting of the prohibition is accompanied by a ritual, and this ritual is the topic of this narrative. Other Maˈya texts, on marriage customs and the history of Samate in the second world war, can be found in van der Leeden (1993 and 1995), respectively.

The abbreviations used in the glosses are explained in the preliminary pages.

(1)	ˈlasa^{3}n	ˈgine	ˈtangga^{3}l	lafa-ˈlu^{3}	may	ˈwono^{3}m	/	ˈpi^{12}t	
	day	DEM	date (<M.)	ten-two	plus	six		moon	
aˈpri^{3}l	/	ˈtaun	ˈi^{3}p-sa	ˈutu^{3}n-si^{3}	ˈlafa^{3}-si^{3}	may	ˈsi^{3}		
April		year (<M.)	thousand-one	hundred-nine	ten-nine	plus	nine		

Today is the 26 of the month of April of the year 1999.

(2)	ˈene	ni-k	ˈnasa^{3}-k-ya[78]	ˈhud	arˈfan	/	ˈʃolo^{3}n
	PRS1S	POS-P1S	name-P1S-FOCS	Hud	Arfan		1S-live
po	samˈte	/	ya-ˈɟadi^{3}	kaˈu^{3}t	ˈdesa^{3}		
PRP	Samate		1S-be (<M.)	head	village (<M.)		

My name is Hud Arfan, I live in Samate, I am the head of the village.

(4)	ˈlasa^{3}n	ˈgine	/	ya-faˈlu^{12}	ʃo	paˈlap	ˈte^{3}	/
	day	DEM		1S-talk	PRP	preparation	sea_cucumber	
ˈte^{3}	po	samˈte	ˈgine	/	ˈte^{3}	ˈada^{3}t		
sea_cucumber	PRP	Samate	DEM		sea_cucumber	tradition (<M.)		

Today, I talk about the preparation of sea cucumber, the custom regarding sea cucumber here in Samate.

[78] It is irregular for a noun like /ˈnasa3n/ ‘name’ to take inflection for person and number.

(5) ˈɟadi ˈʃum te kaˈna[3] waˈbla[12]p ˈte[3] /
ADV (<M.) time RL FUT 3P-prepare sea_cucumber

aˈro waˈkan ˈada[3]t
must (<M.) 3P-do tradition (<M.)

So when they want to prepare it, they have to follow the tradition.

(6) saloˈlon sa[3]l ˈmere[3]-mana /
for_example tomorrow-DEM

kaˈna wˈafalo[3]l be ˈwa[3]l ˈte[3]
FUT 3P-go_seaward PRP 3P-take sea_cucumber

For example, tomorrow they want to go to sea to take sea cucumber.

(7) maˈle[12] ˈgine / ˈpi[3]n ˈma[12]n wa-ˈfyul baˈʃe[3]f
evening DEM woman man 3P-gather all

po kaˈu[3]t-ya ni ˈu[3]m
PRP head-FOCS POS-3S house

Then this night the women and men all gather in the house of the village head.

(8) waˈbla[12]p / ak te waˈbla[12]p kaˈtutu[3]p /
prepare some RL cook *ketupat* (<M.)[79]

taˈke[12]k ˈtolo / waf-ˈmo[12]l ˈfa[12]s kaˈmini[3]s
chicken egg 3P-CS-cook rice yellow

They cook – some make *ketupat*, others prepare chicken eggs, others cook yellow rice.

(9) wafaˈyo[3] ˈga[3] ˈso[12]m-ya / ˈga[3] te ˈwa[3]l
3P-CS-decorated tree holy-FOCS tree RL 3P-take

po ˈga[3]lolo ʃomaˈlo[3]l
PRP forest DIR-seawards

They decorate a holy tree – a tree which they brought from the forest to here.

(10) ˈʃutulʃutulo ˈai kaˈte[12]m / ˈʃutulo ˈai ˈlu[3]
sometimes tree one sometimes tree two

Sometimes one tree, sometimes two trees.

[79] *Ketupat* is Malay for a container to cook rice in, made by plaiting long leaves. The rice in the *ketupat* is then cooked in coconut milk.

(11)	a	ˈga^{3}	te	wa-fa-ˈyo^{3}	gia
	INT	tree	RL	3P-CS-decorate	DEM

So this is the tree which they decorate.

(12)	ˈana	ˈsi^{3}f	kaˈpal	maˈme^{3}	maˈla^{3}	ˈbu^{3}s
	PRN	cloth	piece	red	blue	white

<They decorate> it with red, blue and white pieces of cloth.

(13)	ˈʃe^{3}f faro	kaˈtutu^{3}p	te	wa-ˈblap-si	ˈma^{12}s	/
	then	*ketupat*	RL	3P-prepare-FOCP	done	

wa-kaˈsa^{12}m	po	/	ˈga^{3}	ˈso^{12}m-ya	ni	kopˈko^{12}p-si
3P-distribute	PRP		tree	holy-FOCS	POS	twigs-FOCP

Then they hang the *ketupat* which they made and cooked in the twigs of the holy tree.

(14)	ˈʃe^{3}f faro	/	taˈke^{12}k	ˈtol	kaˈpyo	ˈfi^{3}t	/
	then		chicken	egg	CLAS	seven	

ˈfa^{12}s	kaˈmini^{3}s	wa-ˈdadao	po	/	ˈbe^{12}m	gaˈna^{12}n	/
rice	yellow	3P-place	PRP		plate	small	

ˈbe^{12}m	ˈfi^{3}t	/	taˈba^{12}k	ˈkopi^{3}	ˈfi^{3}t	/
plate	seven		tobacco (<D.)	hand-rolled	seven	

kamˈʃu^{3}	kaˈpyo	ˈfi^{3}t	/	ˈnya^{12}n	ˈket	ˈfi^{3}t
areca_nut	CLAS	seven		betel_leaf	CLAS	seven

Then <they hang> seven chicken eggs, yellow rice, placed on seven small plates, seven hand-rolled cigarettes, seven areca nuts, and seven betel leaves.

(15)	ni	saˈratan	aˈro	saˈgia
	POS-3S	obligation (<M.)	must (<M.)	like_this

The obligation of <the sea cucumber tradition> requires it like this.

(16)	ˈga^{3}	ˈso^{12}m	ˈgine	/	ni	meˈre^{3}mʃe	ˈw-u^{3}t
	tree	holy	DEM		POS-3S	morning	3P-bring

ˈfa-ˈlo^{3}l	be	po	ˈti^{3}p	ˈlol	te	po	ˈye^{12}f
DIR-sea	PRP	PRP	lake	content	RL	PRP	island

giˈlofa	po	rumbaˈbo
DEM-sea-DIR	PRP	Rumbabo

The morning of <the following day>, they carry this holy tree seawards, in order to <bring it> to the lake which is on the island over there in the sea, on Rumbabo.

(17) sa'ba^{12}p 'te^{3} 'gine ka'ri-ya po /
CNJ (<M.) sea_cucumber DEM origin-FOCS PRP

'ti^{3}p 'lol gia
lake content DEM

Because the sea cucumber has its origin in that lake.

(18) 'ga^{3} 'so^{12}m gine 'sanam 'ana 'o^{12}n gia /
tree holy DEM 3P-plant PRS place DEM

'be 'ʃu^{3}t ni fa'lofi^{3}-si
3P-give PRP POS-3S offering-FOCP

The holy tree they plant it there, they give it with its offerings.

(19) saga'ro^{3} 'but 'op 'to^{3}l /
CNJ 3S-arrive day three

fo'ro 'gu^{12}t mu'lay wa-ka'sa^{12} 'ana / wa-ka'sa^{12} be
CNJ begin (< M.) 3P-open PRN 3P-open CNJ

/ wa-ka'sa^{12} be / 'w-ele 'te^{3} gi'to
3P-open CNJ 3P-descend sea_cucumber ADV

When three days have passed, only then do they open it. They open it [sasi] in order to dive to the sea cucumber.

(20) 'ɟadi fas'lu^{3}s gine ma'la^{12}s sa'po^{12}
so (<M.) story this long NEG

So this story is not long.

(21) salo'lon 'sa^{3}l 'w-a^{3}l 'te^{3} saga'ro^{3} 'pi^{12}t 'sa
for_example 3P-take sea_cucumber until moon one

'pi^{12}t 'lu^{3} a'to 'pi^{12}t 'to^{3}l /
moon two CNJ (<M.) moon three

be 'te^{3} 'kuru^{3}ŋ / 'ana wa-f-'mo^{12}l ʃo^{3}
CNJ sea_cucumber insufficient (<M.) PRN 3P-CS-begin ADV

They harvest sea cucumber for, for example, one month, two months or three months, until there is no longer enough sea cucumber, and then they do it again.

(22)	wa-kaˈbene^{3}t	wa-ˈkan	ˈsasi	/
	3P-close	3P-do	sasi (<M.)	

wa-ˈkan	ˈsasi	wa-kaˈsa^{12}	ʃo^{3}
3P-do	sasi (<M.)	3P-open	ADV

They close <the *sasi*>, observe the *sasi* taboo, observe the *sasi* taboo, and then they open it again.

(23)	ˈɟadi	fasˈlus	gine	ˈbut	ˈbe^{3}s	giˈto
	ADV (<M.)	story	DEM	3S-reach	only	ADV

So this story ends here.

Appendix E Additional tables

Table E.1: Mean (mn.) duration in milliseconds, standard deviation (s.d.), and number of cases (#) by syllable and stress, over speakers and items. (Chapter III)

Stress	**Penult. syllable**			**Final syllable**			**All syllables**		
	mn.	s.d.	#	mn.	s.d.	#	mn.	s.d.	#
[+stress]	130	29	53	180	34	55	156	40	108
[-stress]	78	18	55	91	22	53	84	21	108
[+&-stress]	103	36	108	136	53	108	120	48	216

Table E.2: Mean (mn.) values for first formant (F_1), expressed in Hertz (Hz) and Bark (Bk), standard deviations (s.d.), and number of cases (#) by syllable and stress, over speakers and items. (Chapter III)

Stress		**Penult. syllable**			**Final syllable**			**All syllables**		
		mn.	s.d.	#	mn.	s.d.	#	mn.	s.d.	#
[+stress]	Hz	653	115	53	667	92	55	660	104	108
	Bk	6.15	.917		6.28	.719		6.22	.82	
[-stress]	Hz	577	97	55	540	77	53	559	90	108
	Bk	5.57	.806		5.27	.637		5.43	.74	
[+&-stress]	Hz	614	112	108	605	106	108	609	109	216
	Bk	5.86	.907		5.78	.844		5.82	.874	

Table E.3: Mean (mn.) values for the selective intensity measure rlB3, standard deviations (s.d.), and number of cases (#) by syllable and accent, over speakers and items. Also the raw decibel values for B3*, before division by the utterance mean. (Chapter III)*

Stress		**Penult. syllable**			**Final syllable**			**All syllables**		
		mn.	s.d.	#	mn.	s.d.	#	mn.	s.d.	#
[+stress]	rlB3*	42.0	4.8	53	45.9	6.5	55	43.9	6.0	108
	B3*	27.2	3.4		30.1	4.4		28.7	4.2	
[-stress]	rlB3*	39.7	7.8	55	35.7	9.5	53	37.7	8.9	108
	B3*	26.0	5.2		23.1	6.1		24.6	5.8	
[+&-stress]	rlB3*	40.8	6.6	108	40.9	9.6	108	40.8	8.2	216
	B3*	26.6	4.4		26.6	6.3		26.6	5.5	

Table E.4: Mean f_0 (mn.) in Hertz (Hz) and ERB, standard deviations (s.d.), and number of cases (#) by syllable and accent, over speakers and items. (Chapter III)

Stress		**Penult. syllable**			**Final syllable**			**All syllables**		
		mn.	s.d.	#	mn.	s.d.	#	mn.	s.d.	#
[+stress]	Hz	133	34	53	156	35	55	145	36	108
	ERB	3.82	.83		4.36	.81		4.09	.86	
[-stress]	Hz	137	31	55	145	35	53	141	33	108
	ERB	3.92	.75		4.12	.82		4.02	.79	
[+&-stress]	Hz	135	33	108	151	35	108	143	35	216
	ERB	3.87	.79		4.24	.82		4.06	.82	

Table E.5: Pseudo-minimal sets for lexical tone in Salawati Maʲya. (Chapter IV)

High	**Rise**	**Fall**
ˈda^{3}l ‘to crow’	ˈba^{12}m ‘k.o. mangrove tree’	ˈgal ‘mouth’
ˈle^{3} ‘land’	ˈde^{12} ‘k.o. kinship term’	ˈbe ‘to give’
ˈga^{3}s ‘gas’	ˈda^{12}f ‘k.o. big sea fish’	ˈbas ‘to say’
ˈlo^{3}l ‘sea’	ˈlo^{12}n ‘ladder’	ˈlon ‘their heart’
ˈwa^{3}l ‘eight’	ˈla^{12}p ‘fire’	ˈlap ‘boundary’
ˈna^{3} ‘sugar palm’	ˈna^{12} ‘sky’	ˈna ‘belly’
ˈwo^{3}l ‘kitchen rack’	ˈmo^{12}n ‘shamanistic cult’	ˈlol ‘content’
ˈga^{3} ‘wood’	ˈga^{12} ‘place’	ˈga ‘cracked’
ˈfu^{3}n ‘*raja*’	ˈfu^{12}n ‘allah, god’	ˈwun ‘to know’
ˈba^{3}n ‘(car) tyre’	ˈba^{12}n ‘k.o. tree’	ˈban ‘to seek shelter’
ˈba^{3}k ‘reservoir’	ˈga^{12}t ‘unripe, angry’	ˈgak ‘worn’
ˈmo^{3}k ‘cup’	ˈlo^{12}k ‘bamboo cage’	ˈlop ‘baking form’
ˈsa^{3}k ‘pocket’	ˈsa^{12}k ‘length of hand’	ˈsak ‘to make a step’
ˈlu^{3} ‘two’	ˈlu^{12} ‘soup’	ˈsu ‘to retreat’

Table E.6: Pseudo-minimal sets for lexical tone in Misool Maʲya. (Chapter IV).

High	**Low**	**Fall**
ˈda^{3}l ‘to crow’	ˈba^{12}m ‘k.o. mangrove tree’	ˈgal ‘mouth’
ˈle^{3} ‘land’	ˈde^{12} ‘k.o. kinship term’	ˈbe ‘to give’
ˈga^{3}s ‘gas’	ˈda^{12}f ‘k.o. big sea fish’	ˈbas ‘to say’
ˈlo^{3}l ‘sea’	ˈlo^{12}n ‘ladder’	ˈlon ‘their heart’
ˈwa^{3}l ‘eight’	ˈla^{12}p ‘fire’	ˈlap ‘boundary’
ˈna^{3} ‘sugar palm’	ˈna^{12} ‘sky’	ˈna ‘belly’
ˈwo^{3}l ‘kitchen rack’	ˈmo^{12}n ‘shamanistic cult’	ˈlol ‘content’
ˈga^{3} ‘wood’	ˈga^{12} ‘place’	ˈga ‘cracked’
ˈfu^{3}l ‘honey’	ˈfu^{12}n ‘*raja*’	ˈwun ‘to know’
ˈba^{3}n ‘(car) tyre’	ˈba^{12}n ‘k.o. tree’	ˈban ‘to seek shelter’
ˈba^{3}k ‘reservoir’	ˈga^{12}t ‘unripe, angry’	ˈgak ‘worn’
ˈmo^{3}k ‘cup’	ˈlo^{12}k ‘bamboo’	ˈlop ‘baking form’
ˈsa^{3}k ‘pocket’	ˈsa^{12}k ‘length of hand’	ˈsak ‘to make a step’
ˈlu^{3} ‘two’	ˈlu^{12} ‘soup’	ˈsu ‘to retreat’
ˈsa^{3}l ‘wrong, error’	ˈfa^{12}n ‘sister’s daughter’	ˈʃan ‘their mother’

Table E.7: Pseudo-minimal sets for lexical tone in Laganyan Maʲya. (Chapter IV)

High	**Rise**	**Fall**
ˈbi^{3} ‘sago’		ˈbi ‘to give’
ˈli^{3}m ‘five’	ˈmo^{12}n ‘shamanistic cult’	ˈlol ‘content’
ˈfu^{3}l ‘honey’	ˈfu^{12}n ‘allah, god’	ˈwun ‘to know’
ˈbu^{3}n ‘to kill’	ˈba^{12}n ‘k.o. tree’	ˈban ‘to seek shelter’
ˈmo^{3}k ‘cup’	ˈlo^{12}k ‘bamboo cage’	ˈlop ‘baking form for sago’
ˈsa^{3}k ‘pocket’	ˈsa^{12}k ‘length of the hand’	ˈsak ‘to make a step’
ˈlu^{3} ‘two’	ˈlu^{12} ‘soup’	ˈsu ‘to anchor, to retreat’
ˈnu^{3} ‘village’	ˈnu^{12} ‘palm (tree/nut)’	

Table E.8: Mean f_0 – mean, standard deviation (both in ERB) and number of cases by toneme, sentence context and dialect. Also mean, standard deviation and number of cases for f_0 value at the vowel onset of the toneless syllable following the target word (only for sentence-medial condition). (Chapter IV)

Toneme	Sentence-final			Sentence-medial			Next vowel onset		
	mn.	s.d.	#	mn.	s.d.	#	mn.	s.d.	#
Salawati									
High	4.80	(.93)	112	4.70	(.96)	228	4.80	(1.1)	228
Rise	4.23	(.83)	111	4.16	(.82)	226	4.86	(1.02)	226
Fall	4.29	(.86)	112	4.25	(.88)	227	4.32	(.95)	227
Misool									
High	3.87	(.68)	110	3.91	(.68)	223	4.04	(.93)	223
Low	3.40	(.65)	110	3.40	(.64)	218	3.68	(.75)	218
Fall	3.87	(.71)	112	3.81	(.69)	222	3.77	(.84)	222
Laganyan									
High	5.04	(.70)	107	4.98	(.73)	103	4.21	(.68)	103
Rise	4.30	(.63)	95	4.14	(.64)	95	4.04	(.63)	95
Fall	4.08	(.66)	98	4.07	(.64)	94	3.98	(.62)	94

Table E.9: F_0 slope – mean, standard deviation and number of cases by toneme, sentence context and dialect. (Chapter IV)

Toneme	Sentence-final			Sentence-medial		
	mn.	s.d.	#	mn.	s.d.	#
Salawati						
High	-.279	(.146)	112	-.226	(.157)	228
Rise	-.194	(.176)	111	0.019	(.107)	226
Fall	.176	(.121)	112	.162	(.113)	227
Misool						
High	-.221	(.154)	110	-.281	(.133)	223
Low	0.077	(.222)	110	.164	(0.086)	218
Fall	0.070	(0.085)	112	0.052	(0.080)	222
Laganyan						
High	-.323	(.157)	107	-.247	(.169)	103
Rise	-.334	(.123)	95	0.062	(.159)	95
Fall	.152	(.100)	98	.176	(.115)	94

Table E.10: Words used in the acoustic analysis of Matbat tones. (Chapter V)

Extra High Fall	**High Level**	**Low Rise**	**Low Level**	**Fall**	
				Rise Fall allotone	**Low Fall allotone**
fa^{41} ‘chalk’				fa^{2} ‘bad’	
la^{41}m ‘brag’	la^{3}n ‘song’		la^{1}m ‘needle’		
	ma^{3}t‘people’	ma^{12}t ‘dead’	ma^{1}t ‘guava’		
		sa^{12}m ‘separate’			sa^{21}m ‘possible’
ma^{41} ‘road’		ma^{12} ‘cooked’			
na^{41} ‘moon’		na^{12} ‘sweet’	na^{1} ‘rain’	la^{2} ‘sun’	
		na^{12}n ‘animal’	na^{1}n ‘betel leaf’		na^{21}n ‘name’
	s-a^{3} 1S-ascend	sa^{12} ‘salty water’			
mo^{41}n ‘areca nut’			mo^{1}n ‘heavy’		
	to^{3}l ‘three’	t-o^{12}l ‘1PIN-stand’			to^{21}l ‘egg’
de^{41} ‘to throw’	de^{3} ‘house’			de^{2} ‘sick’	
n-e^{41}n ‘3P-sleep’	ne^{3}n ‘mother’		ne^{1}n ‘to carry’		
t-e^{41}l‘1PIN-descend’		te^{12}l ‘chop’	te^{1}l ‘push off’		
	hu^{3}ŋ ‘to enter’	hu^{12}ŋ ‘to search’			hu^{21}ŋ ‘to use’
	nu^{3} ‘village’	nu^{12} ‘to kiss’	nu^{1} ‘coconut’		
tu^{41} ‘grass’		tu^{12} ‘to peel’		tu^{2}‘thunder’	
			ni^{1}p ‘to fly’		ni^{21}p ‘to press’
	ya^{3}w ‘banana’				ya^{21}w ‘seed’

Table E.11: Descriptive statistics for Matbat tones. Average values for each measure: f_0 mean, f_0 standard deviation, f_0 at vowel onset, f_0 maximum, time of f_0 maximum, f_0 slope, and vowel duration. (Chapter V)

		F_0 Mn.	**F_0 S.d.**	**Vowel onset f_0**	**Mx. f_0**	**Time of mx. f_0**	**F_0 Slope**	**Vowel dur.**
Extra High Fall	Hz	184	33.8	212	222	.19	1.298	170
	ERB	4.93	1.09	5.53	5.71			
High Level	Hz	171	5.0	165	179	.72	.977	197
	ERB	4.68	.156	4.55	4.85			
Low Rise	Hz	145	8.9	145	163	.80	.936	206
	ERB	4.10	.289	4.08	4.49			
Low Level	Hz	133	7.0	146	148	.02	1.064	190
	ERB	3.81	.223	4.09	4.14			
Rise Fall	Hz	157	12.1	153	172	.57	1.00	212
	ERB	4.35	.394	4.28	4.69			
Low Fall	Hz	143	17.6	167	169	.03	1.19	159
	ERB	4.04	.578	4.56	4.61			
All tones	Hz	156	13.9	165	176	.41	1.07	189
	ERB	4.33	.450	4.53	4.76			

Samenvatting in het Nederlands

In sommige talen, zoals Nederlands en Engels, kunnen woorden minimaal van elkaar verschillen in de positie van de woordklemtoon. In het Nederlands, bij voorbeeld, vinden we dat in het woord *kanon* ‘schietwapen’ de tweede lettergreep duidelijker uitgesproken wordt dan de eerste, terwijl in het woord *canon* ‘manier van zingen’ het omgekeerde het geval is: hier is de eerste lettergreep prominenter dan de tweede. Deze twee woorden zijn identiek, op de woordklemtoon na: in *kanon* ligt die op de laatste lettergreep, in *canon* op de voorlaatste.

Een heel ander verschijnsel is lexicale toon. In talen als het Chinees en het Thais kunnen woorden minimaal van elkaar verschillen in het toonpatroon waarmee ze worden uitgesproken – zulke talen worden toontalen genoemd. Om een voorbeeld te geven – in de toontaal Iau betekent /be/ ‘vuur’ wanneer het met op een lage toonhoogte uitgesproken wordt, ‘slang’ wanneer het een hoge toon heeft, ‘bloem’ wanneer het een dalend toonpatroon draagt, etcetera.

De belangrijkste bijdrage van deze dissertatie is dat bewezen wordt dat een taal zowel contrastieve woordklemtoon (zoals in het Nederlandse voorbeeld) en ook lexicale toon kan vertonen. In Hoofdstuk 3 wordt aangetoond dat Ma'ya, een taal die gesproken wordt in de Raja Ampat archipel (Oost-Indonesië – zie Figuren II.1, II.3, en II.4), allebei heeft. Ma'ya heeft drie lexicaal contrastieve tonen, die kunnen voorkomen op de laatste lettergreep van het woord. In het dialect van Ma'ya dat op het eiland Salawati gesproken wordt, kan de woordklemtoon op de voorlaatste of op de laatste lettergreep liggen in woorden die op de laatste lettergreep de hoge toon hebben.

Van geen enkele taal is eerder aangetoond dat ze zowel contrastieve woordklemtoon en lexicale toon heeft, en er is ook een verklaring voor waarom zulk een combinatie niet mogelijk zou moeten zijn. Talen die woordklemtoon hebben, gebruiken toonhoogte om de lettergreep die de woordklemtoon draagt nadruk te verlenen in zinsverband. Bij voorbeeld, wanneer een spreker van het Nederlands het woord *canon* met nadruk uitspreekt, dan heeft de eerste lettergreep een relatief hogere toonhoogte. Hier is er een potentieel probleem voor de combinatie van lexicale toon en woordklemtoon. Als er een taal zou bestaan die allebei heeft, dan zou het gebruik van toonhoogte voor de codering van nadruk door de hoorder verkeerd geinterpreteerd kunnen worden als een hoge lexicale toon.

Kennelijk doet dit probleem zich niet voor. Het lijkt erop dat in Ma'ya, dat zowel lexical toon als woordklemtoon heeft, toonhoogte niet gebruikt voor de markering van nadruk, en op die manier de codering van woordklemtoon en lexicale toon zuiver van elkaar gescheiden houdt. Lexicale toon wordt gemarkeerd door toonhoogte, en woordklemtoon door andere akoestische parameters: duur, klinkerkleur, en intensiteit. Het verschil in akoestische codering tussen lexicale toon en woordklemtoon blijkt duidelijk uit Figuren III.6 en III.7. Deze figuren geven aan

voor welk percentage van de woorden in de dataset succesvol geclassificeerd kunnen worden voor de positie van de woordklemtoon (Figuur III.6) en lexicale toon (Figuur III.7) op basis van vier akoestische parameters. Terwijl toonhoogte ('F0 mean' in het plaatje) een betrouwbaar correlaat is van lexicale toon, speelt het geen rol van betekenis in de codering van woordklemtoon. Voor de andere akoestische parameters is de situatie omgekeerd.

Als Ma'ya dus de eerste taal is waarvan aangetoond kan worden dat ze zowel contrastieve woordklemtoon als toon heeft, hoe komt het dan dat deze combinatie zo schaars is? Het antwoord heeft te maken met het ontstaan van toontalen (tonogenese). Tonogenese gaat vaak gepaard met een verlies van lettergrepen. Naarmate een taal meer woordcontrasten codeert met lexical tonen, is de verhouding eenlettergrepige woorden in haar woordenschat groter. De woordenschat van bekende toontalen, zoals bij voorbeeld Thais en Chinees, is hoofdzakelijk eenlettergrepig. Deze tendens naar eenlettergrepigheid bij tonogenese heeft een direct gevolg voor woordklemtoon. Contrasten in woordklemtoon zoals *canon* versus *kanon* kunnen enkel voorkomen in meerlettergrepige woorden. Naarmate een taal dus verhoudingsgewijs meer eenlettergrepige woorden heeft, wordt woordklemtoon meer en meer irrelevant. De schaarste aan talen met zowel woordklemtoon en lexical toon kan dus toegschreven worden aan het effect van tonogenese op de lettergreepstructuur van de woorden van een taal.

Deze hypothese wordt ondersteund door de data van Ma'ya. De vergelijking tussen Ma'ya en verwante talen in Hoofdstuk 6 maakt duidelijk dat in Ma'ya tonogenese uitzonderlijk niet gepaard ging met een tendens naar naar eenlettergrepigheid in de woordenschat. Daardoor ging woordklemtoon niet verloren toen Ma'ya een toontaal werd, wat leidde tot de combinatie van lexicale toon en contrastieve woordklemtoon. Dit geeft weer aanleiding tot een nieuwe vraag: waarom ging de ontwikkeling van lexicale toon in Ma'ya niet gepaard met een evolutie naar een eenlettergrepige woordenschat?

Dit brengt ons bij de taalsituatie in Oost-Indonesië. Ma'ya en de andere oorspronkelijke talen van de Raja Ampat archipel behoren tot de Austronesische taalfamilie. De Austronesische talen stammen allemaal af van Proto-Austronesisch, dat ongeveer 5.000 jaar geleden gesproken werd in Zuid China of op Taiwan (Blust 1985). Proto-Austronesisch was geen toontaal – dat blijkt uit het feit dat slechts 1,2 procent (15 talen) van 1.236 Austronesische talen lexical toon vertonen. Vanuit Zuid China of Taiwan migreerden de Austronesiërs naar de eilanden van Zuid-Oost Azië, en koloniseerden de eilanden van de Stille Oceaan. Op en rond Nieuw Guinea bleef de Austronesische expansie beperkt tot kustgebieden en eilanden zoals die van de Raja Ampat archipel. In deze gebieden kwamen de Austronesiërs in contact met de Papua's, de nakomelingen van mensen die circa 50.000 jaar geleden de eilanden van Zuid-Oost Azie, Nieuw Guinea, en Australië gekoloniseerd hadden. Van belang hier is dat lexicale toon niet ongewoon is in de Papua taalgroep (Donohue 1997). Het contact tussen de Austronesiërs en de Papua's blijkt uit het uiterlijk van de mensen van de Raja Ampat archipel en andere gebeiden waar beide groepen met elkaar in contact kwamen. Verder liet het contact ook sporen na in de talen: in de gebieden

waar zij met elkaar in contact kwamen vertonen de Austronesische talen kenmerken die typisch zijn voor Papua talen, en omgekeerd.

De afwezigheid van een evolutie naar eenlettergrepigheid in Ma'ya kan dan toegeschreven worden aan het feit dat lexicale toon nooit ontstaan is in Ma'ya zelf, maar een overblijfsel is van een Papua toontaal waarmee de Austronesiërs in de Raja Ampat archipel in contact kwamen. Ma'ya kreeg dus lexical toon door de Papua's die in de contactsituatie betrokken waren. Zij hadden een toonsysteen 'in hun hoofd', en door hen raakte het geïncorporeerd in het klanksystem van de taal die uit de contactsituatie voortkwam. Dat er geen evolutie plaats vond naar een meer eenlettergrepige woordenschat kan toegeschreven worden aan de Austronesische invloed in de contactsituatie.

Deze hypothese wordt ondersteund door de ontdekking van een tweede Austronesische toontaal in de Raja Ampat archipel (zie Hoofdstuk 5). Deze taal, Matbat, wordt gesproken door tussen circa 1.000 mensen op het eiland Misool, halfweg tussen Nieuw Guinea en het eiland Seram. Matbat heeft vijf lexicale tonen, twee meer dan Ma'ya dus. De invloed van Papua talen is erg duidelijk in Matbat, veel meer nog dan in Ma'ya. Terwijl in Ma'ya de woordenschat grotendeels afgeleid is van Proto-Austronesisch, is in Matbat de niet-Austronesische (Papua) woordenschat verhoudingsgewijs erg groot, en deze woorden zijn voornamelijk eenlettergrepig. En in het stuk van de woordenschat dat wel van Proto-Austronesisch afgeleid is zijn veel woorden gereduceerd tot een lettergreep, in overeekomst met het niet-Austronesische deel van de woordenschat. Het is dus duidelijk dat de Austronesische invloed in de ontwikkeling van Matbat kleiner was dan in de ontwikkeling van Ma'ya.

Hoofdstuk 4 staat los van de bovengenoemde discussie. Dit is een studie over het verschil in de realizatie van de lexicale tonen in drie dialecten van Ma'ya, die op verschillende eilanden (Salawati, Misool en Waigeo) gesproken worden. Onderzoek naar dialectale variatie in het toonsysteem van Ma'ya is de moeite waard, omdat het inzicht geeft in hoe een toonsysteem verandert mettertijd. De verschillen tussen de toonsystemen van deze dialecten moeten ontstaan zijn sinds de dialecten uit elkaar gegroeid zijn sinds migratie naar andere eilanden leidde tot de splitsing van de sprekersgroep. De studie is gebaseerd op een vergelijking van opnames van de drie lexicale tonen met acht sprekers van elk van de drie dialecten.

In het algemeen is er over de talen van de Raja Ampat archipel niet veel bekend. Vóór het onderzoek dat tot deze dissertatie leidde was er slechts één publicatie: de fonologie van Ma'ya door van der Leeden (1993). Wat de andere talen betreft was er zelfs onzekerheid over hun aantal en hun namen, en de enige data waren woordenlijsten. Het overzicht van de talen in de Raja Ampat archipel in Hoofdstuk 2 geeft een overzicht van talen, wat er van hen bekend is, en hoe zij zich tot de rest van de Austronesische taalfamilie verhouden. Wat de taalsituatie van de eilanden Misool en Waigeo betreft is dit overzicht betrouwbaar. Onduidelijk blijft echter de taalsituatie op het eiland Salawati – het is onduidelijk of hier een, twee of drie verschillende talen gesproken worden.

Curriculum vitae

Bert Remijsen werd op 26 oktober 1974 geboren te Merksem (België). In 1992 behaalde hij het diploma Algemeen Secundair Onderwijs (afdeling Latijn-Grieks) aan het Onze-Lieve-Vrouwe College te Antwerpen. Aansluitend begon hij aan een studie Slavische talen en culturen aan de Katholieke Universiteit Leuven. In 1994 behaalde hij zijn kandidatuur (= tweejarige propedeuse) in Oosteuropese Talen en Culturen, met onderscheiding. Eerder dan de bovenbouwstudie in dezelfde richting af te maken, koos hij voor de opleiding Algemene Taalwetenschap aan de Universiteit Leiden. Zijn interesse ging vooral uit naar de fonetiek, en in 1996 behaalde hij het doctoraalexamen, op basis van stage-onderzoek uitgevoerd aan de afdeling Kennisgestuurde Systemen van de Technische Universiteit Delft. In 1997 trad hij in dienst bij Lernout & Hauspie Speech Products, waar hij als taalspecialist werkte aan de ontwikkeling van een tekst-naar-spraak systeem voor het Nederlands. Een half jaar later gaf hij zijn ontslag om als beurspromovendus en later als assistant-in-opleiding (AiO) te werken in het project '(Woord-)prosodische systemen van de talen van Indonesië'. In het kader van dat project deed hij gedurende in totaal één jaar veldwerk in Indonesië, op Ambon en in de Raja Ampat archipel. Deze dissertatie is gebaseerd op dit veldwerkonderzoek. Na zijn tweede veldwerkperiode verhuisde hij naar Edinburgh, waar hij een deeltijdse aanstelling heeft als docent aan de University of Edinburgh.